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To this, the seventy-fourth annual meeting of our Association, opened so auspiciously, it is my privilege to welcome you officially.

It was with trepidation that preparations for it were proceeded with in this year of stress, but its carrying on will be justified if our coming together enlarges the common store of useful knowledge; increases our mutual understanding; helps to sweep away obstacles to the advance of the healing art, and quickens us to do our bit in freedom's cause, whose battle-line reaches to our homes, our gardens, and our pockets.

Last year at the closing of the meeting, I took opportunity to thank the members there for selecting me for the presidency of this venerable body, and I now repeat how sincere is my appreciation of this distinction. It is most gratifying to have bestowed on one your best gift, as it expresses what all men covet earnestly—the good-will of one's associates. And yet there wells up in mind the thought, that when in the sunny south I was placed in line for the chair I may now occupy, it was, in part at least, because I was a citizen of no mean country, and the majority of you, holding allegiance to another, sought in some measure to show your younger brother of the north that your heart was with him when he rushed into the fray to fight for the liberty championed by Great Britain, and thrilled that fond mother who had thrown her protecting arms about him from his tenderest years, without other return than his loyalty and love.

Fifty years ago, Canada had her first Dominion Day, when from the position of a group of provinces lying on the banks of a mag-

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nificent waterway, she stepped into self-conscious nationhood, embracing a territory which now stretches from sea to sea, and from the river, St. Lawrence, to the end of the earth. Britain's tenure of Canada depends neither on the strength of her battalions nor on the might of her fleets. Within her borders there has not been stationed since my earliest recollection a single soldier, nor a single cannon over which Britain claimed control. Yet her influence in her great colony has grown more and more powerful. The Canadian people are animated by the same sentiments of loyalty as are found in the isles of their fathers, and British interests are as secure in their keeping as in the very core of the empire.

I need not recount Canada's contribution to the present conflict. Everywhere in this country you have been generous in the extreme in expressing admiration of the spirit of the Dominion.

Germany did not believe that the lion would be able to obtain effective assistance from its whelps in the event of a European war. This opinion must have been derived from the Victorian era, when knowledge of the colonies was vague.

It is only within recent years that British statesmen have shown any real understanding of their dominions beyond the seas. There was a day when one can imagine their welcoming the news that every colony of the Empire had issued a declaration of independence, fashioned on the model of that with which Washington confounded the politicians who surrounded the King.

Canada got on the British map during the Boer war, appealingly and permanently. Over in England they sat up and took notice then, though many who are fighting with us now were not quite sure we were doing the right or chivalrous thing. But most people outside of Germany and Britain did not realize that the Kaiser's cable to Kruger was the formal shying of his helmet into the ring, and the existence of the British Empire was at stake in South Africa. In the darkest period of the Boer war, Canada had sprung to arms, which should have been an augury to Germany of what the colonies would do when their mother was in trouble.

It is a part of our national creed that what the 19th century was to this great neighboring republic, the 20th will be to my country. Canada's soil is destined to support teeming millions. With boundless acres, enriched by wastefulness while the lone Indian

scoured the plains, capable of providing the world with the finest of the wheat, with mineral stores of wonders untold, with unrivalled natural forces and virgin forests, with a stern yet invigorating climate, one would indeed be bold who would picture the meridian splendor of the nation which possesses such an heritage.

The most important purpose of such an association as ours is the mutual improvement of its members by advancement in knowledge. No class stands in greater need of getting together frequently than do men of our profession. We are called on to decide complicated problems involving the well-being, yea, the very lives of our fellows. The experience of the greatest is limited. It is easy to stray from the narrow path. There is no corrective equal to discussions with others. In this matter our Association has accomplished much. We have a journal to link us together through the year. It gives an account of our meetings which is a boon for those who cannot attend. Experimenters through this medium can convey information as to their hopes, aims and accomplishments directly, without filtering through foreign publications. That man deceives himself, however, who fancies he can derive the same benefit from a perusal of the JOURNAL as he would from coming to our meetings. He misses the second object to be attained in a society like this—the binding together of its members by means of social intercourse.

Ample time should be allowed for interchange of opinion over the tea cups, or any place as congenial. While there is room for reminiscences not purely scientific, mental stimulus is to be derived from contact one with another, quietly discussing problems about our life-work.

"Our discords, quenched by meeting harmonies,
Die in the large and charitable air."

The present time is for all of us one of deepest anxiety, with a great sense of unrest. The angry clouds of war have hung heavily over us for nearly four years, and show no signs of lifting. Many friends are overseas, to mitigate suffering, liable and ready to give their lives, if need be, in behalf of country, liberty, and our ideals of honor, truth and justice. Some dearer to us than tongue can tell are in the fighting ranks, in jeopardy every hour.

With such distraction it was impossible to focus the mind on such an address as you have usually had from the long line of my

forerunners, even were such timely, and I capable of keeping to the beaten path. The constitution says your president shall prepare an inaugural. He is not to come here, open his mouth and expect the Lord to fill it. In an effort to obey, I shall occupy further time while you become acclimated to this lake-region with an endeavor to discover some silver lining to the leaden clouds on which Mars is riding so recklessly. For myself, I was born beside these waters after they had laved Chicago, and so am quite at home. The horrors of war are so constantly present that there may be some consolation in looking for another side.

I remember how in the first days of the war we stood aghast and said it could not endure more than a few weeks; how David Starr Jordan proved conclusively, we thought, that the bankers would never permit a world war to begin; how Samuel Gompers said that labor would prevent the rupture of international peace; and how that brilliant wielder of the pen, Goldwin Smith, had declared that Canadians would never face a bayonet for England's sake. We have lived to see how far astray were such surmises. The greatest conflict in history not only began but has extended over weary years. Laboring men who had pledged their word to protect their alien brothers flew to the colors of the greatest autocrat of all time, and the best of Canadian youth are over there where they have proved themselves of such stuff that no troops have put greater fear into the hearts of the foe. They have shown invaluable initiative, innate to the new world, and your boys will do the same.

So, though the future may not bear one out in taking the optimist's view-point, no harm can follow "reaching a hand through time to catch the far-off interest of tears."

Every evil thing is followed by some good, and every achievement of good only uncovers some further ill for men to combat. Early in the war, in nearly all the belligerent countries, there was a sudden decrease of crime due to the absorption of many law-breakers into the armies, and fewer idle hands for Satan to get busy with. A few months later, however, juvenile crime increased from lack of parental control, the fathers having gone to war, the mothers to work.

Likewise war found work for everybody. Thousands of families who were never far from the starvation line, now earn

wages they never dreamed they could command. That is a good thing, but it too has its demoralizing side. Money thus unexpectedly possessed threw men and women off their moral balance, and the saloon has flourished.

It is in these contradictory elements in our progress that ammunition is found for optimists and pessimists. The pessimists claim that the evil counterbalances the good. The optimists take the opposite view and history seems to favor the latter.

Medicine itself is likely to gain little from the experience of war. It has taught the surgeons much about the proper application of Listerian principles; physicians, the efficacy of inoculations against diseases which formerly decimated armies; alienists, the effects of shell-shock. But such advances in knowledge, valuable as they are in themselves, have comparatively little application to ordinary life. The practical humanity of the medical officers, shown in so many ways, is indeed a relief to a contest in which angry nations use every means of destruction to exterminate each other. But the blast of war that blows on our ears makes the still small voice of science inaudible.

Some comfort comes from learning that there is no evidence, in Great Britain at least, that since the outbreak of the war the amount of insanity has increased. There has actually been a decrease in hospital admissions, due mainly to the absence of so many men in the army, who are dealt with by the military if they become insane. Among women, the higher wages earned, and the separation allowances regularly received, have relieved domestic uncertainties. Many who had nothing to do previous to the war have forgotten self by throwing their energies into active work for others. Rich and poor alike are now busy all the time. The result is a vast improvement in the nation's mental stability. People whose lives were empty are interested from morning till night. Work is the surest consolation for the grievous sorrow of war.

Even among the soldiers mental disorders have not been as prevalent as expected. The French conclude that with a few exceptions, in which a pre-existent organic taint was always to be found, the war has not been productive of insanity. It were well, quoth the observer, if the opposite could be said, namely, that insanity has not produced the war. What was chiefly feared was

mental disorder among men worn out by the fatigue of the campaign, but such cases have been rare. The circumstances of service in the field react on the mind in so many ways and so differently from the influences of peace that new forms of mental trouble may result.

The experience of the war is certain to lead to better lunacy laws. There has long been complaint that mental disorders have been regarded on a different basis from physical. Though in no department of medicine is the need greater for the earliest treatment, yet the tendency of existing laws is to cause remedial treatment to be postponed. The trouble arises from the fact that the laws governing these matters were framed by lawyers who are concerned in arranging how people are to be protected. But public health asks how mental sufferers are to be best treated so that they may be cured. The lawyer's view-point though important has been allowed to outweigh all others. The war has made it necessary to deal with the problem in a fresh, untrammelled way. Hitherto, the law has hindered early treatment in many cases by making certification necessary for admission to an institution, by inflicting the stigma of pauperism, and by branding the recent case with insanity with all the disastrous consequences that flow therefrom, unjust though they be. The army has brushed these difficulties aside. Numerous cases of recent mental disturbance among the soldiers have been dealt with in special hospitals without being certified insane in the usual way. Out of nearly 4000 such cases among the British troops less than 200 had to be transferred to an insane institution. The soldiers suffer from the stigma neither of insanity nor of pauperism, and there is no obstacle to the earliest and best treatment. A civilian should have the same advantages when a mental breakdown threatens. There is no essential difference between the case of the soldier who becomes insane in the defence of his country, and that of a woman who suffers from mental symptoms brought on by producing her country's defenders.

The maxim that medical science knows no national boundaries has been rudely shaken by the war. The Fatherland has been preparing for isolation from the medical world without its confines. Just as years ago the Kaiser laid his ban on French words in table menus, so as early as 1914 German scientists embarked on a cam-

paign against all words which had been borrowed from an enemy country. A purely German medical nomenclature was the end in view. The rest of the world need not grieve much if they show their puerile hate in this way. It will only help to stop the tendency to Pan-Germanism in medicine which has for some years past been gaining headway.

The Germans excel all other nations in their genius for advertising themselves. They have proved true the French proverb that one is given the standing he claims. On a slender basis of achievement they have contrived to impress themselves as the most scientific nation. Never was there greater imposture. They display the same cleverness in foisting on a gullible world their scientific achievements as their shoddy commercial wares. The two are of much the same value, made for show rather than endurance—in short, made in Germany.

While they were preparing men and munitions for their intended onslaught for world dominion, they were spending millions of dollars to win the admiration of both the working classes and the intellectuals of other nations, extolling the superior conditions of the Fatherland, picturing it a paradise, with model homes, short hours and high wages. This was but a cloak for the sinister plans of Prussian autocracy. But how great has been the disillusionment! The facts are its working classes labored longer hours than in any other country and for starvation wages, the women and children toiled like beasts of burden in most strenuous trades, sweat-shops abounded, many suffered from lack of fuel and food, farmers were oppressed with a rigid caste system so arranged that a peasant child could never become other than a peasant. Instead of the villas embowered with flowers, the general mass of workers lived in barrack tenements, gloomy and foul, lacking baths and heat, but with gaudy exteriors as camouflage.

In the earliest months of the war, it was pointed out that there are tendencies in the evolution of medicine as a pure science as it is developed in Germany which are contributing to the increase of charlatanism of which we should be warned. A medical school has two duties—one to medical science, the other to the public. The latter function is the greater, for out of every graduating class 90 per cent are practitioners and less than 10 per cent are scientists. The conditions in Germany are reversed. There, there were 90 physicians dawdling with science to every 10 in practice.

Of these 90, fully 75 per cent were wasting their time. In Germany, the scientific side is over done and they have little to show for it all, while the human side is neglected. Even in their new institutions, splendid as they are in a material sense, it is easy to be seen that the improved conditions were not for the comfort of the patients.

Out of this war some modicum of good may come if it leads to a revision of the exaggerated estimate that has prevailed in English-speaking countries of the achievements of the Germans in science. We had apparently forgotten the race that had given the world Newton, Faraday, Stephenson, Lister, Hunter, Jenner, Fulton, Morse, Bell, Edison and others of equal worth. German scientists wait till a Pasteur has made the great discovery, on which it is easy for her trained men to work. She shirks getting for herself a child through the gates of sacrifice and pain; but steals a babe, and as it grows bigger under her care, boasts herself as more than equal to the mother who bore it. Realizing her mental sterility, drunk with self-adoration, she makes insane war on the nations who still have the power of creative thought.

Alienists have been infatuated with German pseudo-discoveries. Novelty of terminology has been taken for originality of thought and their works on insanity have been accorded undue authority. We ignored the substance in our own and the Motherland, and chased the mirage on the Continent.

Since the German army was successful in 1870, it has been idolized, and the admiration bestowed on it has extended, so that in spite of the fact that the Germans themselves have gone to other countries for their ideas, we have cultivated a superstition of German pre-eminence in everything, but especially in science. There might be some excuse for this if they had made any discoveries comparable with those of the circulation of the blood, of vaccination, of asepsis; all made by men who speak our language; or if German names were identified with important lesions or diseases, as are those of Colles, Pott, Bright, Addison, Hughlings Jackson, Hutchinson, Argyll-Robertson and others.

But it is especially in mental science that the reputation of the Germans is most exalted and is least deserved. For every philosopher of the first rank that Germany has produced, the English can show at least three. And in psychiatry, while we have

classical writings in the English tongue and men of our own gifted with clinical insight we need seek no foreign guides, and can afford to let the abounding nonsense of Teutonic origin perish from neglect of cultivation.

The Germans are shelling Paris from their Gothas and their new gun. Murdering innocents, to create a panic in the heart of France! With what effect? The French army cries the louder, they shall not pass; Paris glows with pride to be sharing the soldiers' dangers, and increases its output of war material; and the American army sees why it is in France, and is filled with righteous hatred. Panic nowhere. Vengeance everywhere. What does the Hun know of psychology? His most stupid, thick-witted performance was his brutal defiance of the United States with its wealth, resources and energy. That revealed a mental condition both grotesque and pitiable.

After the war a center of medical activity will be found on this side the Atlantic, and those who have watched the progress medical science has made in the United States will have no misgivings as to your qualifications for leadership. If we learn to know ourselves, great good will come out of this war.

Since 1914, there has been an awakening of the public conscience regarding health. An impetus has been given by the wonderful results of sanitation in the armies. In this we are interested because bodily disorder often foreruns mental, and many cases we treat are due to an infectious disease usually avoidable. Long ago, Disraeli declared that public health is the foundation on which rests the happiness of the people and the strength of the nation. Statesmen generally are only now recognizing that not only is the well-being of many millions of workers involved, but that the development of a country is checked if due attention is not given to the many problems associated with the maintenance of health.

In my home province this spring, the government has created a health department to give at least as much attention to human beings as it has done to domestic animals or the moose that attracts sportsmen to the wilderness. The more grave the situation in France becomes, the more vigorously should we strive to shield those who can assist in greater production from preventable disease and lessened efficiency. The war has impressed us with the fact that the childhood of the nation is the second great line of

defence and every child must be saved not alone for its own sake or its parents, but for the continuance of the nation.

This war has shown us the value of developing the bodies of our young people. Wherever soldiers have been in the making there has been demonstrated what a change military training brings about in the recruits, converting youths of poor physique into erect, strapping, ruddy athletes. It is hard to realize they are the same human material, but for the first time in the lives of most of them they have learned how to live. When compelled to endure hardships such as they never knew before, or lie in hospital recovering from wounds, the fitness secured by training is a decided factor in their favor. When the cruel war is over and welcome peace has stilled the stirring drum, shall the call for this physical fitness be no longer made? The need of it will not pass away. The demands of peace make it necessary that every youth be made as perfect as possible. And this applies equally to girls. The country which would produce a hardy race must have strong women as well as strong men.

Nationally, we had almost completely ignored the cultivation of the body. We make it compulsory for every child to submit to years at school for the sake of intellectual training. But its physical development has been left largely to chance and nature, and then when we call for soldiers we find a third of our youth unfit. It must be the state's business to attempt in every possible way to develop the physical life of our young people. Even if it meant the taking of a whole year for necessary training it would be a national boon, adding as it would, 5 or 10 years to the life of the individual. The time for trusting to luck and letting things slide has surely passed. Benjamin Franklin said wars are not paid for in war time. The bill comes later. This is a sad truth, but the bill will be settled the sooner if we make the most of the rising race.

The war will hasten some scheme to provide all who need it with medical care. Often among the working classes disease leads to distress and distress to disease, and charity in some form has been obliged to assist in destroying this vicious circle. Free hospitals have arisen but this condition is not ideal, yet the man with meager income must accept this charity. A better plan appears to be that of an insurance under which all wage-earners are compelled while well to accumulate a reserve which will defray part, at least, of

the expense during periods of disability. Some such plan has just been pressed on the British to provide in case of illness or injury adequate care for all persons whose income is less than \$800 a year. Nine-tenths of the general practitioners in the British Isles have entered into the scheme.

On this Continent, little attention has been given to a measure of this kind, but it seems probable that whether medical men like it or not a similar one will become law on this side of the Atlantic.

The war has brought about a curtailment in the abuse of alcoholic drinks. For some years past there has been a revolution going on in regard to intoxicants. The world-wide attack on liquor at the outbreak of the war was simply the crystallization of an antagonistic sentiment which had been slowly forming based on scientific evidence of the physiological and social effects of alcohol drinking.

There is no reason to suppose that the great temperance wave is a passing thing which will ebb when the excitement of the war is over. Unless all signs fail, it represents a permanent gain whose far-reaching benefits members of this Association will be the first to appreciate. It is not the moral reformers who have brought prohibition to pass. There is now a solid body of educated sentiment behind the law. Business corporations are roused against the liquor traffic as they certainly were not 25 years ago, because they now recognize that whiskey and efficiency make a poor team. The world has traveled a long way since that first teetotaler applied for life insurance and was charged an extra premium because total abstinence was so dangerous to health.

Social standards even in England, which still retains a bad pre-eminence in drunkenness, have marvelously changed since the days of Charles Dickens, who was quite unconscious that intemperance was anything more than an amiable weakness of generous and convivial hearts.

We are abolishing the bar. We still have the bottle. The quack-medicine vendor is busier than ever. Money is plenty and he wants some of it. He uses mental suggestion and interests us. He is a specialist in distortion who probes into the ordinary sensations of healthy people and perverts them into symptoms. Every bill-board, newspaper, fence-rail, barn and rock thrusts out a suggestion of sickness as never before. The only

vulnerable point to attack the vicious traffic is the advertising. If governments forbid that as they should, the next generation will be healthier and richer. If we are going to let imagination play let us exercise it on suggestions and symptoms of health.

The world is moving rapidly in these days and to women is being granted their rightful place. They are being given the ballot, not as a reward for what they had done in the war, but because they possessed the patriotism and the intelligence which entitle them to share in the conduct of public affairs.

We have been struck by the readiness with which our boys have responded to the country's call, and have admired their cheerfulness, but more impressive has been the heroism of the mothers, the wives, the sweethearts and the sisters, who have sent forth the best we breed without a murmur. Theirs is the harder task to go quietly on with the daily routine while the heart is in France with the boys they love. While many talented ones have been prominent in public service, behind them lies a great army of women who are not known outside of their own small circle, and who are yet the nation's richest possession, its most sacred trust, who make life attractive, and freedom possible and worth while. We would never have had such valiant armies in France if it had not been for the brave women at home. The advent of women into political life means purer government and the coming of long overdue reforms in the laws of the land.

Even our religion will be a better brand because of the war. Creeds count for little over there and will never again divide men as they have done. Less and less emphasis is put on the sweet bye and bye, and men's thoughts are turning to the service of their fellows here and now. They are recognizing the practical unity of religion and the square deal all round.

And so it will come to pass,

"That mind and soul, according well
May make one music as before,
But vaster."

The war is teaching us the value of thrift, that exceedingly useful virtue which most men practise only when they must. But unpopular as it has been, stern national necessity is now helping to restore it to its rightful place. On this continent we have not as yet gone far in this direction. But in the Motherland there is another story. For over two years not a single new pleasure

auto has been manufactured. Big social functions are not merely bad form—they have ceased altogether.

The traffic in luxuries in certain cases has been entirely wiped out. Everybody is wearing old clothes and saving the wool for the boys in the trenches, and saving the food that the army may be properly fed. England is practising economy such as she never did before, and the strange thing is that apparently business is better than it was in the days of more luxurious living. One reason for this condition is undoubtedly the fact that everybody is working. The scale of living for the rich has been lowered, but the scale of living for the poor has been raised. This is probably a help to both. The pinch really comes, however, on the middle classes whose salaries have not increased, but whose expenses have gone up by leaps and bounds. And yet there is no grumbling. The men who grumbled at everything in pre-war times are now silent when they have really something to grumble about. England in prosperity may sometimes be hard to put up with, but England in adversity is magnificent.

The war has done much for us if it has done nothing more than to reveal men to us. Before the war, we judged them by their petty virtues or petty faults, and we thought we judged correctly; but now we see that under it all lay a capacity and a willingness for self-denial and cheerful self-sacrifice that we had never suspected. The real nature of men has come to the surface, and we stand amazed at the goodness and grandeur of it. On this side the Atlantic, we have not yet seriously tackled the luxury question, but we shall have to deal with it in radical fashion, before our war debts are paid. Luxuries, whether they be costly or the smaller ones in which poorer men indulge, are not a necessity to national development or to individual happiness, and their abolition does not either ruin trade or make men discontented and unhappy. If the war teaches us this it will mean much for our future national and individual well-being.

Hospital superintendents, who are responsible for maintaining hundreds of lives and the operation of many acres, may be vital factors in both saving and producing, and thus play the game. It may be the only war service some of us can render.

With France all the time within a few days of starving; with Great Britain relying on us for 65 per cent of her essential foods; with the wheat of Argentina and Australia too distant to be avail-

able, Northern America must step into the breach to avert famine for a warring world and the fate that has overwhelmed the greatest empires of the past. A time of food shortage is at the door. It is hard to take it to heart while money is plenty. But money will not take the place of bread. By eating no more than we need, and by stopping waste, a good deal can be done to relieve the situation. At any rate, a good habit will have been formed.

But the common sense way of undertaking to prevent famine is to increase the food supply. This cannot be done in every land. Some nations are cultivating every foot that has not a building on it. But on this Continent the case is different. Here there are yet countless acres waiting for the breaking plow. In Great Britain they are tilling every available plot, and it is of just as vital importance to us that we increase production here as there. We are equally concerned in the outcome of the war.

Recently governments passed a law enacting that every able-bodied adult must be engaged in some useful occupation. If enforced without fear or favor it would set to work the tramp and the pampered son of the foolish rich man alike. Everyone would become a producer of wealth. It would be good for the country and still better for the idler himself. Idleness, whether of the poor or rich, is a crime against the state and is also the fruitful parent of vice and degeneracy. Ideals are changing; the gentleman is now a respectable citizen who toils in his country's service.

Distant though we be from the din and smoke of the battle-fields, there is opportunity for us to prove ourselves heroes in the strife. These stars must not be left to do it all.* Each should take to heart that,

"It isn't the task of the few—
The pick of the brave and the strong;
It's he and it's I and it's you
Must drive the good vessel along.
Will you save? Will you work? Will you fight?
Are you ready to take off your coat?
Are you serving the State?
Are you pulling your weight—
Are you pulling your weight in the boat?"

* Referring to the "service flag" behind the speaker's desk with more than 90 stars, representing members of the Association in the army medical service.

There are not a few who, over three years ago, were almost wishing that they had never lived to see such a dire day as was then dawning, but who have come to see through the years that the dark day of tragedy was also a day glorious with opportunity and destiny. It is even now said that had the war been won two years ago, it would have been the worst thing for our nation, as its lessons had not been learned.

A new and better day is coming for this war-wrecked world. The sea before us is uncharted, and there may be much that differs radically from the past, but we can only do as Columbus did—sail on.

A new spirit is moving in the masses of society. Men's ways of thinking are changing more rapidly than at any other time in history. Before the war it was said that to spend 25 millions yearly on social reforms in Great Britain would mean national bankruptcy. Now it is found that more than that can be spent in a day to ensure the national safety. It will be found after the war that great expenditures to improve social conditions will come as a matter of course.

The soldiers will return with enlarged views of democracy and social justice. The rich and the poor, the learned and the ignorant, have together looked death in the face. The sense of brotherhood and comradeship has been immensely strengthened. Those who were less favored under the old social system will be inclined to demand justice and equality. Those who were more favored will be inclined to concede the demand. Artificial distinctions of rank and even distinctions founded on superior capacity and learning, fade away before the proof of the common virtues of manhood. The equality that is sought is the equality of brotherhood and of rights.

Just as in war time, so it must be in time of peace—the good of the country, the well-being of the many, must prevail against the privileges and over the rights of few. This is good politics. It is true patriotism. The world is going to be a better place for the great masses of men. If we can but keep up the habit that we are to-day learning of being world citizens, interested in great enterprises outside of ourselves, then we would be helping to build the democracy of the future, which must more and more become a society in which duties are greater than rights, and to serve a finer thing than to get.

If in these introductory remarks I have not been able to detach myself from the world's most serious business at the present time, perhaps on reflection they may not have gone very far afield from the subject which binds us together in an association. If there is to be a change in the conditions under which we live this must have its effect on the minds of men; whether for good or ill, I will not stop to speculate. We are intensely concerned with environment. This war itself is entangled with it.

England's greatness, her devotion to honor, truth, and fidelity, is due to the environment in which her children are trained and grow to manhood.

The ivy-grown wall, the vine-clad hills and the rose-covered bowers constitute the birth-place of English character.

Gerard tells us the cause of the war is the uncongenial environment in which the German youth is cradled and reared. The leaden skies for which Prussia is noted, its bleak Baltic winds, the continuous cold, dreary rains, the low-lying land and the absence of flowers have tended to harden the spirit and rob it of its virtue, produce a sullen and morose character, curdling the milk of human kindness.

It is a greater pleasure than usual for Canadians to meet with their American cousins in this year when our two countries are joined in the grim but glorious comradeship of war in defence of the heritage and aspirations that belong to us both. Our fathers came from common soil, their veins flow common blood. For over a century we have lived as good neighbors in the friendly rivalries of peace. Through proximity we have adopted more and more your ways without becoming a whit less true to the British flag.

After this war we will be still better friends. We will have been in a fight together and on the same side. We will carry flowers across the seas to lay on mounds in the same clime. The boys who come back will have the same stories to tell of struggles and triumphs. Let us hope that the present is the dark hour that precedes the dawn, and that ere long the sky may be fired with the red glow of the rushing morn; that soon the shot that brings victory—the last one—may be heard, and if it come from an American gun, no Canadian will begrudge you the lucky honor.

The war has achieved much in cementing the two great English-speaking nations of the world as nothing else could possibly have done.

Great Britain and the United States have never before fought shoulder to shoulder, but they are doing it now, and the fact is one ominous to their enemies. A common peril has united them, and a common aim will perpetuate the union. To no group of people will success in the war mean more than to the Anglo-Saxons, and the fact that this great family will in future dwell together in undisguised confidence and good-will is worth in itself all that the war has cost.

The Allies are depending on this land for food and men, for ships and guns, for ammunition and aeroplanes, and this is leading Britain to recast its views of the United States, and is leading the latter to regard Britain in a more favorable light than ever before. The old suspicions and the ancient grudges are being melted away. Years of misunderstanding were trodden underfoot when American boys marched through the streets of an amazed and admiring London.

It had long been a reproach that on this Continent men cared for nothing but the almighty dollar and made gold their hope, but when the call came to sacrifice for the good of the Allies no nation ever responded more gladly or liberally. Britain asked for meat, all you could spare, and you answered with meatless days, with the result that the United States has been able to supply millions of pounds more of bacon and beef than were expected. To-day the British workman has his normal supply of meat, thanks to America's response.

Germany never played more clearly into the hands of her foes than when she scornfully defied the world's greatest republic, in the mistaken conviction that while the United States was of great potential strength she would not dare to challenge the mightiest military machine that ever cursed the world. But Germany's blunder will prove the world's salvation if it succeeds in binding together in friendship, the two great peace-loving, freedom-cherishing, English-speaking democracies, Great Britain and America.

In 1493, a tiny barque, frail and scarred by many a storm, the first craft from America, returned to the shores of Europe. She bore what was then termed the richest freight that ever lay upon the bosom of the deep—the tidings of a new world beyond that vast waste of water which rolled in untamed majesty to the west.

That was a year of good news for the people of Europe. The thirst for gold was as keen in the 15th century as it is to-day and the discovery of Columbus disclosed to monarchs and adventurers alike visions of wealth.

Little could they reckon that in this year infinitely more precious freight would be borne across the same pathway, when ship after ship, leviathans of the deep, would bring from that new world to somewhere in Europe, offspring of the sturdy pioneers from the old land, who in braving the savage forces of nature had found liberty, legions of brave and noble men, in martial array, with the star-spangled banner at the mast-head, to reveal to the war-bound nations visions of something with which those of the wealth of the boundless West or the gorgeous East could not compare—visions of freedom for all mankind.

Thank God! "Our fathers' God, to whom they came in every storm and stress," America did not turn a deaf ear to the laureate's apostrophe:

"Gigantic daughter of the West,
We drink to thee across the flood;
We know thee most, we love thee best,
For art not thou of British blood?
Should War's mad blast again be blown,
Permit not thou the Tyrant Powers
To fight thy mother here alone,
But let thy broadsides roar with ours."

TRAUMATIC AND EMOTIONAL PSYCHOSES.

SO-CALLED SHELL SHOCK.¹

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"Traumatic psychoses" and "mental disorders supervening at the occasion of traumatism" are not the same.

In the first place, one should not include among traumatic psychoses mental disorders which are brought on by some factor which may be associated with or superadded to a traumatism, as, for instance, an attack of delirium tremens in an alcoholic who has met with an injury, or one of febrile delirium in a wounded man who has developed an infection.

It is proper also to exclude those post-traumatic mental disorders which, by reason of their clinical manifestations or a characteristic morbid anatomy, find their place in a definite pathological group, such as general paralysis, dementia præcox, or a constitutional psychopathic state. In such cases we are dealing not with traumatic psychoses but with general paralysis, dementia præcox, or a constitutional psychopathic state in the etiology of which the traumatism has played a part the importance of which is variable and for the most part merely contributory and indirect.

Thus far all are agreed.

¹ (TRANSLATOR'S NOTE.—The European armies have suffered in the course of the present war a large incidence of mental disorders. It may be predicted that when the American army becomes fully engaged in the struggle many cases will develop for psychiatric study. Therefore any studies of war psychoses that have been made by the medical officers of the European armies cannot fail to be of practical interest to us. One of the most lucid presentations of the subject that have come to my attention is this one, which was published by the author in the form of a new chapter added to the fifth French edition of his *Manual of Psychiatry*. I have translated it in order to bring it within more ready access of medical officers of the American army.)

It has, however, also been customary to include among traumatic psychoses the many cases in which mental disorders have broken out after a traumatism which is in itself but slight, perhaps insignificant, but which is accompanied by an intense emotional shock. This is but an abuse of language. The effectual cause here is the emotional shock. The physical trauma is nothing, the psychic trauma—to use an expression which is more than a mere figure of rhetoric—is everything. This is true to the extent that mental disorders observed in cases of this sort are identical in nature, in severity, and in their course with those known to be produced by a violent emotion acting alone, *i. e.*, independently of any somatic injury. The term “traumatic psychoses” in application to these cases is, therefore, inappropriate and should be replaced by the term “emotional psychoses.”

Thus one is led to distinguish: *a.* traumatic psychoses proper, resulting either from a localized cerebral lesion or from a general concussion of the brain; *b.* emotional psychoses, due to emotional shock with or without a traumatism which is more or less slight and not necessarily involving the brain; to which should be added *c.* the cases of war psychoses or so-called shell shock, which, as we shall see, are nothing but emotional psychoses.

A. TRAUMATIC PSYCHOSES PROPER.

I shall speak but briefly of the psychic manifestations which supervene when an injury results in a localized cerebral lesion.

In one group of cases the cerebral lesion is conditioned by a lesion of the skull—either a compound or a simple fracture. The mental disorders generally consist in psychic paralysis, often beginning with a comatose phase and amounting, in degree, from mere mental dullness to complete stupor or an agitated and delusional state of confusion, depending upon whether or not the psychic paralysis is complicated with exaggeration of mental automatism.

To the mental symptoms are added eventually symptoms of destruction or irritation of the part of the brain affected: paralyses, contractures, focal epilepsy, disorders of speech, etc.

The prognosis *quoad vitam* depends upon the region injured, the extent of the lesion, and ultimate complications.

The prognosis *quoad mentem* depends to a certain extent upon the same factors. A very extensive lesion is almost bound to be followed by a definite mental deficit, more or less pronounced. Nevertheless the relation between the magnitude of the cerebral lesion and the gravity of the mental disorders which are its permanent consequence is far from being absolute. Certain destructive and very extensive lesions, notably of the frontal lobes, are particularly well borne from the psychic as well as the physical standpoint. The present war has furnished numerous instances in point. One of the most celebrated is that of Guépin.³ I have had under my own care a wounded man who had had the greater part of his frontal lobes destroyed by a shell fragment, the case note from the hospital in which he was first treated estimating the loss of cerebral substance at 200 grams. About four months after the injury he showed but slight mental enfeeblement, consisting mainly in weakness of attention and memory, certainly much less marked than one would expect in view of the amount of damage.

In a second group of cases the traumatism likewise produces a localized brain lesion, but the latter is wholly internal without involvement of the skull or integument. The lesion may be a rupture of a blood vessel resulting in hemorrhage. The characteristic symptoms, which generally do not appear until several hours, very exceptionally several days, after the injury—the time in which the effusion of blood takes place—are those of rapidly developing cerebral compression: intense headache, vomiting, slowing of the pulse, confusion, automatic agitation, delirium, finally signs of paralysis ending in death.

The traumatism may also be the starting point of a pathological process of slow development, generally, in such a case, a cerebral neoplasm. The physical and mental symptoms are at first slight or absent, grave symptoms appearing after several weeks or even months. The symptomatology and course are those of brain tumor.

We may dwell at greater length on traumatic psychoses due to concussion of the brain, either by direct violence such as a blow on the head, or by indirect violence such as landing, from a fall, on the feet or on the buttocks.

³ Reported to the Academy of Sciences on March 22, 1915.

I shall submit first a clinical example:

ADRIEN D., mason, aged 35, without abnormal family or personal antecedents, fell from a scaffolding about five meters high upon unpaved but dry and hard ground. He was picked up unconscious and taken to his home.

Externally was found only a small contused wound at the top of the head, without lesion of the bone, which healed in a few days.

After being in coma 18 hours the patient gradually regained consciousness, but for eight days he remained in a state of very marked confusion. He is stupid, dull, completely disoriented as to place and time, and dreams a good deal, especially at night. He reacts to physical stimulation (pricking, pinching), but does so slowly and feebly. He does not respond to questions unless they are very simple. He has become oriented as to place but is still completely disoriented as to time. His attention is difficult to gain and impossible to hold. Recollection of occurrences preceding the accident is labored and inaccurate. He has complete amnesia for the accident and what followed. Actual impressions are fixed in his mind for but a very short time: at the end of five minutes he forgot that he had been visited by the physician. He often brings his hand up to his head without saying anything, and when asked if it hurts him says "Yes, a little." In the day time some illusions are noted, the patient mistaking persons for one another. Sleep is scarce, and the greater part of the night is passed in a dream state, chiefly occupational: he thinks it is time to go to his work, asks for his clothes, gets up and looks for his tools, converses with imaginary persons, complains that the cords have not been properly placed, that the mortar is too thick, etc.

After the first week attention and memory improved a little. The patient retains some few impressions; yet the amnesia of fixation, though no longer complete, as in the preceding period, is still very marked. The disorientation of time persists. A most active and mobile tendency to confabulation has appeared. One month after the accident, when the patient had not yet left his bed, he told of having been eight days before at the fair in X., where his brother-in-law, a cattle dealer, had gone to sell some oxen. In response to leading questions he gives minute details, which vary from one moment to the next and become contradictory. When the contradictions are pointed out to him he admits readily that he may have been mistaken as his memory has failed him. The realization of his abnormal state is, however, but transitory and weak. When told that he is sick and must take care of himself he shows an irritability not previously noted, falls into violent anger, refuses medicine which is offered him, saying he has had enough and wants to go.

He has a vague idea that he has been in an accident, but, although it has been spoken of many times in his presence, cannot tell the exact circumstances of it. Until the sixth week he knew only that he had fallen, but from where, what height, how, he did not know: perhaps from a roof, or a ladder, or a scaffold—such things, he said, happened often in his trade. Sometimes, by way of confabulation, he becomes more specific.

Thus about five weeks after the accident he told how he had fallen from a carriage while he and his master were on their way to see what work there was to be done. Another day he told that a heavy brick had fallen on his head. (In fact he had had a brick fall on his head about two years previously, but from a very low height and without causing any appreciable harm.)

He inquires from time to time if his insurance has been paid, but does not occupy himself effectually with the defense of his rights and does not seem to be interested in the progress of the negotiations concerning this matter.

Physically there is to be noted, aside from the headache mentioned above, only a general muscular weakness and some vertigo. No signs of any localized cerebral lesion. No convulsive manifestations.

The patient's condition remained almost stationary for about three months. After that, gradually, attention improved, memory was restored, the pseudo-reminiscences became more rare and were spontaneously corrected. Finally at the end of six months he could be considered convalescent, there remaining but occasional vertigo, a certain mental and physical fatigability, and an amnesic gap commencing very sharply a few instants before the accident and ending imperceptibly somewhere in the course of the second month by giving place to some fragmentary and vague recollections which grew gradually more complete and more precise.

This case represents a type of traumatic psychoses. In it are found combined the etiological and symptomatological features of the psychopathic states resulting from severe cerebral concussion by violent traumatism: a close chronological relation between the injury and the onset of the symptoms, the latter directly following the former; period of coma, period of marked confusion with dreams, passing by insensible transition into a semi-confused period characterized mainly by weakness of attention, amnesia of fixation, and confabulations; gradual and slow amelioration of the symptoms of the last period and progress toward recovery, the patient retaining only a definite gap of amnesia for the accident itself, the comatose period, and a part of the period of confusion, and an abnormal fatigability which may persist for years.

Within this type the following variations occur:

Variations in symptomatology, depending on predominance of mental dullness (*stuporous form*), of delusions and psycho-sensory disturbances (*delirious form*), or confabulations (*paramnesic form*); also depending on the superaddition to the basic syndrome of various phenomena, such as epileptiform seizures (*convulsive form*), paralyses, Jacksonian convulsions, aphasias (*localized*

forms). The phenomena of cortical inhibition or irritation which characterize the localized forms are generally due to small hemorrhagic foci, for the most part subarachnoid, and lumbar puncture, performed in the beginning, reveals the presence of blood in the cerebrospinal fluid.

Variations in intensity: fulminating form of concussion of the brain, in which the patient dies in the comatose stage, and which is but of forensic interest; *mild form*, in which the comatose period is lacking and the clinical picture is reduced to a transitory mental dullness accompanied by vertigo and ringing in the ears and followed by a brief period of physical fatigue.

Variations in course: demented form, in which a state of psychic deficit establishes itself definitely. It is probable that in cases of this sort the mental disorders are conditioned by permanent lesions, most frequently hemorrhages, sometimes also irritating lesions, necrotic or neoplastic, which are superadded to the concussion but which, not affecting any of the projection areas, at first pass unnoticed. Such demented states belong to the organic psychoses and not to psychoses of concussion proper.

Cerebral concussion, resulting from a physical shaking up, should have its *anatomic lesions*. These are not yet known, doubtless by reason of their minuteness which renders them inaccessible to our means of investigation.

Their *mechanism* has been made the subject of two hypotheses: one, due to Duret, which assumes a sudden displacement of cerebrospinal fluid, the other, due to Koch and Filehne, which assumes a direct shaking up of the nervous tissues by the traumatic shock.

The *prognosis* is generally favorable, excepting, of course, the fulminating and demented forms.

The *treatment* should consist for the entire duration of the acute manifestations—aside from surgical intervention which may be indicated by focal symptoms—in absolute and continuous rest, counter-irritation of the lower extremities, relief of congestion of nervous centers by means of leeches applied to the mastoid processes, and, in cases in which there are signs of general cerebral compression, lumbar puncture or trephining for decompression.

Mental re-education is indicated, at first in moderation, later, upon the disappearance of the confusion, more and more inten-

sively, in the form of exercise designated to stimulate memory and attention.

B. EMOTIONAL (PSEUDO-TRAUMATIC) PSYCHOSES.

Here again the best way to begin is with an example:

FELIX R., aged 40, accountant, was about to step out of an elevator to the first floor of a building. As he started to put his foot on the edge of the landing, the cage of the elevator unexpectedly went down again and carried him down. There does not seem to have been any violent shock, the cage of the elevator being in no way damaged, and two bottles which the patient was carrying in a basket remaining unbroken. R. was able to open the door of the elevator and to walk as far as the janitor's apartment. According to the latter, he appeared wild, terrified, and said only, in a scarcely audible voice, as though choking, "Elevator . . . fell." He was taken to a drug store where he was given some ether to inhale, and from there in a carriage to his home.

A physician who was called found no injury and ordered rest in bed.

For two days the patient remained in a state of prostration interrupted by several attacks of very marked anxiety in which he would sit up in bed and grasp his bed clothes or any person who might be near him, crying, "I fall . . . I fall . . . Help." There is not the least sign of any localized cerebral lesion.

On the third day the patient's condition improved rapidly. At that time was found a slight contusion of the left shoulder; the patient, who until then had felt nothing on that side, began to complain of much suffering there.

Upon his becoming quite lucid again it was found that he had preserved an exact recollection of the accident. He remembered how, at the moment when he was about to leave the elevator, he felt "as though the ground disappeared from under his feet and he saw himself carried down with staggering rapidity"—in reality the elevator must have gone down at no excessive speed—he felt an impact and after that he remembered nothing more.

He continues depressed, psychasthenic, and markedly overemotional. The facial expression is one of fear, the voice low, scarcely audible, speech hesitating; he starts at the least noise, slamming a door causes an attack of trembling; he cannot apply himself to any mental work, not even reading a magazine; old recollections are evoked with difficulty and incompletely; current events impress themselves in a fragmentary fashion and are quickly effaced; but it is to be noted that the patient, discouraged, convinced of his mental helplessness, makes no effort to overcome it.

This condition persisted in its entirety when I saw the patient three months after the accident: speech disorder; very marked weakening of attention which caused the patient, though accustomed to the work of an accountant, to give up an attempt to solve a simple example in arithmetic;

a most marked amnesia of fixation; a heightened emotional state manifested by trembling and tachycardia (pulse up to 120 per minute); undue preoccupation with thoughts of his health and his future: he shall never recover from this shock, "all cells have been shattered," it is all over, he shall no longer be able to work, his wife and two children shall be reduced to poverty. Finally, he awaits with impatience and anxiety the outcome of the negotiations started with the owner of the building in which the accident took place.

At the end of a year and a half the matter was adjusted by an indemnity, much lower than that which the patient had claimed at first, yet reasonable. Little by little the symptoms improved, and two years after the accident the patient could be considered cured. He still remains excitable and emotional, but he had been thus all his life. It is important to note, in fact, that the patient is in make-up emotionally very unstable, becoming uneasy and downcast at the least difficulty, not capable of enduring the slightest sorrow, and—what explains this abnormal psychic constitution—the son of an alcoholic father and a suicide mother.

The appearance, manifestations, and course of the pathological condition in this case may be summarized as follows: bad heredity, an emotionally unstable constitution, an accident producing an insignificant injury and an intense emotion; transient state of confusion with dream manifestations systematized upon the accident of which the patient has preserved an exact recollection; a subsequent prolonged state of heightened emotional tone and psychasthenia; extreme anxiety as to the consequences of the accident; improvement and later rapid disappearance of the psychic symptoms, immediately after the settlement of the question of indemnity.

It will be seen that this picture is very different from and in many respects the opposite of the preceding one.

The differences and the contrasts are in the very nature of the two conditions. In the first case (traumatic psychosis) the symptoms are the expression of a concussion, that is to say, a physical shaking up of the brain, while in the second (emotional psychosis) they are caused not by a traumatism, but by its accompanying emotion; in other words, they are of psychogenic origin: hence their purely psychic character and the influence which psychic factors have on their course—as shown, in the last case, by the cure following closely upon the settlement of the question of payment for damages.

To the purely psychic manifestations which constitute the basis of emotional psychoses are frequently added either neurasthenic

symptoms (headache, pain in the spine, muscular weakness, astasia-abasia, and other neuropathic manifestations which it is customary to connect with neurasthenia) or hysterical ones (paralyses, contractures, anæsthesias, hyperæsthesias, etc.). When such symptoms occupy a preponderating place in the general picture one has to do, as the case might be, either with a traumatic neurasthenia, or hysteria, or, when the two kinds of symptoms are combined, a hysteroneurasthenia. In fact there is no sharp demarcation between these nervous states and the purer forms of emotional psychoses; and it might be of advantage to group them all together under the name *traumatic psychoneuroses*, or, better still, *emotional psychoneuroses (pseudo-traumatic)*.

The *etiology* of emotional psychoses—or, if one prefers it, psychoneuroses—is simple. They require two factors: (1) a predisposed soil, in the shape of an unduly emotional constitution; (2) an emotional shock. As was said in the beginning, the traumatism is nothing, the emotion is everything. If emotional psychoses frequently follow a traumatism, it is because the circumstances producing the emotion can also produce a traumatism; but the latter may be lacking without the psychic and nervous symptoms being thereby modified in the least. Instances of emotional psychoses due solely to an emotion are not rare in the clinic. I can cite one in a young girl who, while imprudently crossing some railroad tracks, just missed being crushed by a train, but escaped without a scratch, and in whom, nevertheless, came on a psychopathic state absolutely fitting that described above. Emotional psychoses have been seen following great catastrophes (serious railroad accidents, the Messina earthquake, the great explosion in Jena, etc.). But it is mainly in the course of the present war that cases of this sort have increased, as we shall see when we come to the consideration of so-called shell shock.

The case which I have cited shows the influence upon the development and persistence of the psychic symptoms of the patient's preoccupations with the damage he thinks he has suffered and its economic and social consequences (diminution of earning capacity). In certain cases, designated *sinister* by Brissaud, this

element dominates the situation. The sinister type has a fairly constant evolution.

The neuro-psychic symptoms immediately following the accident are either absent or slight. The emotional shock which characterizes ordinary emotional psychoses, and the evidences of which were so plain in the above cited case of Felix R., is either not seen at all or seen to be but slight. But little by little, under the influence of idleness, of the depressing effect of the environment, and especially of the desire to obtain from those responsible for the accident or from insurance companies a high indemnity, the patient refuses, as it were, to get well. Far from attempting to overcome the difficulties which he experiences, for instance, in walking if the leg hurts him a little, or in mental work if it is somewhat of a strain for him to fix his attention, he refuses to make any physical or mental effort, and sometimes, in order to make sure that the damage which he has suffered may not be appraised below its importance, he exaggerates the symptoms which he experiences. It is said that the patient often becomes in such a case his own dupe, that is to say, he comes to believe in the gravity of the symptoms which he at first deliberately exaggerated. This is possible, but, in fact, there is no way of fathoming the conscience of a sinister case and to know—at least where gross fraud is not established—when he acts in good faith and when he knowingly exaggerates.

Generally the symptoms keep growing worse or, after attaining a certain degree, remain stationary until the settlement of the indemnity. Thereafter they disappear either suddenly or, more commonly, gradually.

However, in some cases the patient feels that the allowance made to him for damages is insufficient, the symptoms persist, and the fixed idea of having suffered an injustice is installed in his consciousness, giving rise to morbid interpretations more or less abundant and more or less illogical.

We here enter the domain of paranoic conditions with their chronic course and their antisocial reactions.

The question arises, should the original accident be considered the cause of the paranoic condition which eventually develops? Should those responsible for the accident, the employers—or the insurance company representing them—be held financially liable for the loss of working capacity, which is total in

most sinister cases? It is impossible, at least where the patient was not already delusional prior to the accident, to answer this question otherwise than in the affirmative.

However, it would seem unjust not to take account of constitutional predisposition, the part played by which, considerable in the etiology of most psychoses, becomes predominating when we deal with a paranoic condition. The total and permanent incapacity which may result in a sinister case from the development of a paranoic condition, should not be likened to the total and permanent incapacity resulting from the loss of both eyes or both legs. It would be poor medical practice to ignore the abnormal soil upon which delusional states develop. The duty of the medico-legal expert here is to make a deep study of the mental condition of the patient before as well as after the accident, particularly to find out characteristics of paranoic temperament which is the basis of delusional states, and to present to the court the problem in all its complexity.

The *treatment* of emotional psychoses is a matter to be handled cautiously, for the reason that too much therapy (medication, hydrotherapy, electricity, etc.) often results in anchoring more and more firmly in the mind of the patient the idea of a serious illness. These various treatments should therefore be tried with prudence and discontinued as soon as it is found that they fail to bring the desired result, and dependence should be placed chiefly on psychic treatment in the shape of training of the will, encouragement, and dispelling by appeal to reason the hypochondriacal notions which tend to arise. We shall return to the subject of psychic treatment in connection with emotional war psychoses. Finally, wherever the question of indemnity arises its disposition should be expedited as far as possible.

C. EMOTIONAL WAR PSYCHOSES (SO-CALLED SHELL SHOCK).

Explosions of projectiles or mines are capable of producing in subjects, showing outwardly no wounds or only insignificant wounds, neuropsychic symptoms more or less severe and lasting.

The cases of this sort fall into three groups.

In the first group, the soldier is thrown by the explosion with a resulting injury to the brain, either by fracture of the skull or by concussion, direct or indirect. The explosion has simply played

the part of an agent of propulsion. The neuro-psychic symptoms present no special character and vary according to the lesion which has been produced.

In the second group, there is no external violence. The subject presents signs of a cerebral or spinal lesion, generally a paralysis (hemiplegia, monoplegia, paraplegia). Lumbar puncture reveals the presence of blood in the cerebrospinal fluid. One deals here with a hemorrhage in the central nervous system, which must be considered a direct effect of the explosion, that is to say, of the changes of atmospheric pressure resulting from the enormous liberation of gases produced by the instantaneous combustion of the explosive substance.

Hemorrhages of this kind may be single or multiple. They are often associated with other internal hemorrhages (pulmonary, plural, visceral, etc.) or with external ones (auricular, nasal) produced by the same cause.³ Here again all the observed symptoms are to be accounted for by an anatomic lesion and correspond to the localization and extent of the lesion.

It is not the same with cases in the third group, which is by far the largest. Here there is no external violence, no hemorrhage, no sign whatever of any organic lesion. The victim of the explosion, generally an excessively emotional subject, exhausted by hardships of the campaign, perhaps just recovered from a more or less severe illness, loses consciousness. For two or three days he remains in a state of confusion most often accompanied by dreams. Then he becomes lucid, but remains asthenic, emotional, living over again in his dreams his past terrors, and complaining of headaches and dizziness. This state may disappear in a few days, or it may persist for weeks or months, with or without complicating functional symptoms centering upon some organ, region or function (deaf-mutism, paralyzes, contractures).

These conditions, of which some have tried to make a sort of psychosis peculiar to war, were at first attributed to cerebral or cerebrospinal concussion: hence the expression Shell Shock by which they have been designated. This interpretation is erroneous and the concept of concussion in relation to cases of this sort inappropriate.

³ P. Ravaut. *Les hémorragies internes produites par le choc vibratoire de l'explosif*. Presse médicale, Apr. 18, 1915, No. 15, p. 114.

The error becomes at once apparent when one considers with some care the above briefly sketched and semi-schematic symptom picture. It is indeed not a picture of cerebral concussion, but one of emotional psychosis. A comparison with the preceding descriptions of these two conditions will show in the first instance a fundamental difference, in the second identity.

But without leaving the domain of war cases, it can be readily demonstrated that the real cause of so-called shell shock is not a concussion but an emotion.

Two soldiers fall sick, one following the explosion of a shell, the other following a violent emotion, for instance, the death of a close friend, killed suddenly beside him, as happened in a case I have seen. The first would be a case of shell shock—in the improper sense in which this term has been used—the second an emotional psychosis. Here surely are two etiological factors very different at least in appearance. Yet, passing into the clinical domain, as one tries to determine in what respect the cases are different one is greatly embarrassed in the attempt. The symptom picture is the same. There will be the same course with the same prognosis, subject to the same contingencies; there will be the same sequelæ, amenable to the same treatment.

Now, identical effects necessarily imply that under a seeming etiological duality is hidden a deeper unity. In the particular case, the explosion and the emotional shock could not translate themselves into the same clinical formula except through the intervention of a common factor. This common factor exists, and is none other than the emotion itself.

The explosion has not only physical effects, but also a psychic one, which consists in an emotional shock. In certain cases this *emotional shock* dominates the situation to the point of being alone responsible for the neuro-psychic symptoms which a hasty and superficial consideration at first placed in relation to cerebral concussion; and it is because both give rise to an emotional shock that the explosion of a shell and a terrifying sight find expression in the same syndrome. *The war psychoses which have been called shell shock are nothing but emotional psychoses*, and they might best be studied under the name "emotional war psychoses."

The *etiology* of emotional war psychoses comprises, accordingly, all the factors capable of producing an emotional shock:

explosions of projectiles (shells, bombs, aerial torpedoes, hand grenades), mines, ammunition stores; terrifying sights (cadavers, conflagrations, etc.); imminence of danger; death of comrades; and injuries (wounds, contusions, sometimes concussion in the correct sense of the word), for the most part not of a serious nature.

These various causes may occur in combination. One may find at the onset of the illness either an explosion preceded or followed by a terrifying spectacle, or imminence of danger combined with a slight wound, etc.

By arranging the causes of emotional war psychoses in three groups—explosion, pure emotional shock, and traumatism—we have found, for a series of 97 cases, the following proportions:

Explosion	68
Explosion and emotional shock.....	10
Emotional shock	9
Explosion and traumatism	6
Explosion, traumatism, and emotional shock....	4

These different factors, whether acting alone or in combination, show no efficacy except as they light upon a soil prepared in advance to undergo their action, a *predisposed soil*. The predisposition results most often from a constitutional defect consisting in emotional instability. "The individuals destined for shell shock are, before all, the emotionally unstable in whom the constitutional peculiarity has mostly manifested itself in their lives at occasions of painful emotion, and who react to events of the war as they have reacted to events of ordinary life, but in a manner infinitely more intense, because the excitants are infinitely more powerful."⁴

This constitutional instability may be accentuated, and even its place at times taken, by all external causes of debilitation of the nervous system: infectious diseases (typhoid fever or simple diarrhea), exhaustion, sometimes a previous explosion or emotional shock. It seems, in the last case, as though there might be a summation of emotional effects. I have cited, in collaboration with Gilbert Ballet, the case of a zouave who, thrown once by the explosion of a shell, escaped with a little dizziness and headache, but remained nervous and irritable and, three months later, after a second explosion, presented a typical emotional psychosis.

⁴ Gilbert Ballet and J. Rogues de Fursac. *Les psychoses commotionnelles, psychoses par commotion nerveuse et choc émotif*. Paris médical. Vol. 6, No. 7, Jan. 1, 1916.

In the mild cases the *symptomatology* of emotional war psychoses is reduced to a brief dazed period; the subject is for a moment stunned, dull, inert, speaking in monosyllables, his voice scarcely audible, articulation indistinct and hesitating. At the end of a few hours, sometimes one or two days, of rest he returns to his usual condition.

Where the disorder assumes a certain gravity one can distinguish, as in ordinary emotional psychoses, two phases: the first, acute (phase of confusion), the second, subacute (psychasthenic phase). I shall consider them separately, following which I shall speak of the systematized functional disorders which may be associated with the two phases respectively.

The *phase of confusion* often begins with loss of consciousness, generally immediately following the explosion or the emotional shock. However, in certain cases, especially the milder ones, the loss of consciousness may be lacking. In other cases, still more rare, the symptoms are delayed: the loss of consciousness and the phenomena of confusion do not supervene until some greater or lesser length of time after the shock causing them. Such was the case of a young infantryman who, having been half buried by a shell, helped to carry on the battle and did not lose consciousness until freed by his comrades.

The confused state which follows closely upon the loss of consciousness, or rather is a direct continuation of it, takes the form either of stupor or of a *dream state*. In the latter case the multi-sensory delirium is an enactment of battle: the patient hears the cannons and machine guns, sees Boches on all sides, looks for them under the beds, makes charges, hurls grenades, etc. This period abounds in abnormal reactions, violence and fugues which give rise to medico-legal questions (violence toward superior officers, disobedience of orders, leaving post, desertion).

It lasts from a few hours to a few days. Sometimes it constitutes the entire illness, the subject quickly recovering his usual mental condition. It would seem that the cases described by Milian under the name Hypnosis of Battles belong to this category.*

In other cases, also rather exceptional, the delirium and confusion may persist for several weeks.

* Milian. *L'hypnose des batailles*. Paris médical, Jan. 2, 1915.

Inversely, this period may be reduced to several hours and have passed off by the time the patient is brought in by the ambulance. I should be tempted to thus interpret the cases reported by Guillain at the medico-surgical convention of the VI Army, under the title "A Syndrome Following Explosions of Large Projectiles Without External Wound," in which he had noted no symptoms other than those of a psychasthenic order.*

The transition from the first to the second period generally occurs abruptly. All of a sudden, in the hospital, in a train, or in an ambulance the subject regains his lucidity, recognizes his surroundings, and becomes oriented as to time. However, it suffices but a few moments of observation to note that he is still liable to show grave psychic symptoms.

Three fundamental psychic changes characterize the *psychasthenic phase*: neuro-psychic asthenia, heightened emotional state, and overactive imagination.

The *asthenia* is apparent from the external aspect of the subject. His attitude is drooping, the face immobile, expressionless, dull. This mask is striking, but, in a sense, deceptive. It results from loss of mimetic power and capacity of expression, and not from a condition of stupor or real indifference, as one might be led to think at first. As we shall see farther on, the patient is lucid, conscious, and, above all, overemotional and far from indifferent, but he is unable to give outward expression of what he feels and thinks. The asthenia is manifested also by psychomotor weakness: the motor reactions are slow, uncertain, feeble. It is not uncommon to see a patient fail to show a grip strength by the dynamometer of more than 10 or 15, sometimes only 4 or 5. The return of psychomotor energy takes place according to a fairly constant formula. Very rapidly, after several days of rest, a notable improvement occurs; the subject who in the beginning showed a grip of but 10 or 15, now shows 25, 30, or 35; then the improvement stops, and it is not until the end of his illness that the patient recovers fully his psychomotor energy.

Mentally are to be noted a weakness of attention, sluggishness of psychic processes, incapacity for intellectual effort, rapid fatigue—all these symptoms being expressed by their usual manifestations and being readily demonstrated by psychological tests

* *Presse médicale*, No. 6, Jan. 31, 1916.

in current use (reading, calculation, copying, crossing out certain letters on a printed page, etc.)—and finally disorders of memory which shall detain us for a time by reason of their constancy, importance, and tenacity. They occur in three forms: amnesic gap, amnesia of reproduction, and amnesia of fixation.

The *gap of amnesia* takes in the phase of confusion. It generally begins immediately *after* the shock causing the trouble: the patient knows that a shell exploded near him, that he was buried by a mine explosion, or that one of his comrades fell by his side, but he generally does not know by whom or how he was conducted to the rear.

In certain cases, not common, the amnesic gap is retrograde in character, taking in the shock itself and even some events preceding it: the patient then does not know what happened to him, nor, sometimes, where he was and what he was doing at the moment of the accident.

Inversely, in the very exceptional cases in which, as already stated, the loss of consciousness is delayed, the amnesic gap is also shifted forward, the patient retaining a recollection of all that passed between the shock and his loss of consciousness. The young infantryman mentioned above who, from the shell hole in which he had been half buried, helped to carry on the battle, remembered very clearly the drum signal announcing the danger, and his amnesic gap did not begin until the moment when, freed by his comrades, he lost consciousness.

The *amnesia of reproduction* is at times so marked that the patient has forgotten his entire past, including the address of his family, the name of the town in which he is stationed, the year of his military class, the number of his regiment, even his own name. In most cases the amnesia is less complete: some impressions have disappeared, others persist, in capricious fashion, regardless of the law of retrogression, old impressions being affected in the same degree as, and at times even in greater degree than, recent ones. We are dealing here merely with a paralysis of the evoking power, since, upon being cured, the patient recovers his impressions in their integrity. Sometimes the artificial evocation of one image, which acts somewhat as a primer, suffices to revive a whole group of recollections; for instance, by naming in the patient's presence the town in which the headquarters of

his organization are located he is enabled to recall the number of his regiment, names of his officers, etc. It is even possible thus to call forth events immediately preceding the shock, which at first might have been believed to be within the amnesic gap. One of my patients, in a fugue, was arrested, and, his case being at once perceived to be pathological, he was sent to the service for cases of confusion of which I then had charge at Ville-Evrard. He was unable to tell what had happened to him, when he had left his organization, and where he was at the moment. Another patient in the hospital, having spoken before him the name of the village B . . . , he recalled at once that he had been at that place, that he there took part in an intense bombardment, that a great shell exploded near him, and that several of his comrades fell. All this was correct, and the shell explosion was the cause of his confused fugue.

The *amnesia of fixation* is no less constant and no less important to recognize than the amnesia of reproduction. In certain cases all events slip by without leaving the slightest trace. The patients know that they are in a hospital, because it needs but a glance around to see the other patients, but they cannot tell the name even if it had been told them 20 times. At the end of an hour they have forgotten the contents of a letter received from their relatives, although they had read it attentively and with interest. They recognize the examiner as a medical officer, address him as "Major," but are unable to tell whether they have already seen him before.

One of my patients, six months after the emotional shock which had caused his trouble, was still amnesic to such a degree that, having spent a day in Paris, he was, on the following day, absolutely unable to recall anything of what he had seen, except the Eiffel tower, the name of which he could not tell but which he described as "a great thing."

These different disorders, psychomotor asthenia, weakened attention, rapid fatigue, diminished capacity for intellectual effort, and amnesia, coexist with a judgment which, if not intact, is at most but slightly altered. The patient is conscious of his psychic reduction, sometimes even overconscious in the sense of exaggerating its gravity: hence, in many, a hypochondriacal tendency which, if not guarded against from the beginning, tends to assert

itself more and more and to become one of the most serious obstacles to recovery. This is exactly what we have found in connection with ordinary emotional (pseudo-traumatic) psychoses.

Similarly, as has already been stated, under the mask of indifference and dullness which strikes one at first, there is hidden an exquisite emotionalism, which is the second element of the tripod on which rests the symptomatology of the psychoses supposed to be due to concussion or shell shock.

The *heightened emotional state* is a continuous condition, consisting of vague uneasiness and apprehension, upon which as a background arise attacks of anxiety occasioned by the most insignificant happenings: a few questions, a medical examination, or simply being called. One of my patients said, "One must speak to my face, otherwise it frightens me." But it is mainly the recollection, however remote, of impressions related to the war that has the particular potency of exciting emotional crises. A shot fired in the distance, the sight of an airplane, a simple conversation about the war, suffice to let loose manifestations of anxiety. Thus another patient of mine, upon hearing several cannon shots, though fired at a great distance, was seized with such trembling that he had to be put to bed.

The *emotional crises* assume in the emotional war psychoses their usual clinical modalities, with all the variations and wealth of symptomatology of which they are capable: tremors, essentially polymorphous as regards localization, form and intensity, being either—and most frequently—limited to the upper extremities, or generalized upon the entire body; either horizontal or vertical, generally mixed; either fine and vibratory, as in Basedow's disease, or enormous, choreiform, with all the degrees that may occur between these two extremes; fibrillary twitchings of the facial muscles, especially those about the mouth; disorders of gait and station which may go as far as astasia-abasia; pulse acceleration up to 150 per minute; panting, irregular and shallow breathing; stammering, scanning or explosive speech, sometimes total verbo-motor inhibition producing transitory mutism. In certain cases the patient gives the impression of suffocating, like a person who has just had a cold spray.

It is to abnormal emotional irritability that are to be attributed the hysterical crises which are frequently seen in cases of so-called

shell shock. The psychic and motor symptoms by which they are characterized (intense affect, abnormally vivid mental images sometimes hallucinations, immoderate motor reactions) are of exclusively psychic origin and are subject, in their onset, development, recurrence, and disappearance, to the influence of the same factors as ordinary hysterical crises: emotion, imitation, presence of spectators, reaction of environment. It suffices to place these patients in isolation and under somewhat strict medical discipline to see the crises disappear as by magic. On the other hand, it suffices to be impressed with their tragicalness, to have them held by several attendants, to make these crises worse and more frequent.⁷

Overactivity of imagination, which constitutes the third fundamental element of emotional war psychoses, generally goes hand in hand with the heightened emotional state, to which is due its development. It manifests itself by abnormally vivid mental images, dreams, sometimes talking in a dream, somnambulism, and in some cases dream delirium, usually nocturnal or at least most marked at night, which is to be considered a continuation or an exacerbation of the dream state of the period of confusion. It is hardly necessary to add that actions of war (bombardment, beating of drums, visions of airplanes, etc.) here make up all the material.

Hallucinations may persist as a sequela after the disappearance or very marked reduction of the other abnormal manifestations. I have reported, with Gilbert Ballet, a case of this sort. This was the case of a private in the infantry, already mentioned, in whom the onset of symptoms was delayed. Three weeks after the explosion he presented nothing more than a slight malaise and some hypnagogic auditory hallucinations consisting in rolling of drums heard by him in the right ear. We said then, "It is evident that the rolling of drums is nothing but a partial reviving of a somewhat more complex emotional delirium, a reviving favored

⁷ I have not seen, following explosions of projectiles or mines or in the course of emotional war psychoses in general, convulsive symptoms other than those of hysterical crises. However, epileptic seizures have been reported (G. Guillaïn, at the medico-surgical convention of the VI Army, May 3, 1915. *Presse médicale*, May 27, 1915). This fact is not surprising, inasmuch as epilepsy can be caused by an emotional shock.

by the lowered consciousness which marks the invasion of sleep."* This would indeed seem to be the only plausible explanation of the hallucinatory sequelæ which sometimes occur after emotional psychoses. The same explanation would apply to the symptoms of a pithiatic nature of which we shall speak farther on.

Emotional psychoses present, aside from the psychic symptoms which have been described, certain somatic manifestations which will now engage our attention.

We shall first take up *subjective symptoms*: feeling of lassitude, fatigue, which is but an expression of the asthenia; headache, constant, generally slight or moderate, worse in the morning on waking, getting better in the course of the day, disappearing under distraction, made worse by painful emotions, presenting, in a word, the features of a neurasthenic headache; vertigo, very frequent, seemingly conditioned, at least in certain cases, by the state of the cerebral circulation: thus one of my patients—victim of a purely emotional shock—had to stop every few moments the work in the garden which I had prescribed for him; each time upon stooping to the ground, as he arose, he would be seized with vertigo and had to lean against something to prevent falling.

The headache and vertigo are in the first period generally masked by the confusion and are not noted until the psychasthenic period. They persist for a long time, often outlasting the other symptoms.

As has been said above, the emotional war psychoses are frequently complicated by *neuropathic (hysterical) symptoms centering upon a function, an organ, or a region*.

I shall not undertake to draw up a whole list of these symptoms, a list which, moreover, would never be complete, for the reason that their functional or anatomic localization depends on fortuitous circumstances, capable of infinite variation. I shall limit myself to the mention of the more common ones.

Deaf-mutism, very common, immediately following the shock, often extending over the entire period of confusion, sometimes persisting through the psychasthenic period or outlasting, in the form of a sequela, all the other neuro-psychopathic manifestations. The disappearance of deaf-mutism is either abrupt and total, the

* Paris médical, Jan. 1, 1916.

patient all of a sudden resuming his speech, sometimes under the influence of an emotional shock, or it is gradual and partial: in such a case the patient can hear, but remains hard of hearing, and he speaks, but in a hesitating, stammering manner and in a low tone of voice; sometimes he ceases being mute, but remains deaf, or vice versa.

Either *deafness* or *mutism* alone may succeed, as just stated, the complete syndrome of deaf-mutism; but either may also exist alone from the beginning. In the cases of deafness, whether pure or combined with mutism, are frequently found auricular lesions (rupture of drum membrane, hemorrhages), due to direct effects of the explosion, but inadequate to produce the deafness presented by the patient (Roussy's three cases). The deafness is frequently complicated by buzzing in the ears, the nature of which, whether somatic or psychic, is difficult to determine. If psychic, then it constitutes a true hallucinatory phenomenon. It was thus in a case observed by Ballet in which the subjective noises, which the patient described as "humming," reproduced exactly the hissing sound of a shell following explosion.

Sensory disorders other than deafness: the least rare, without being common, is blindness, which generally disappears rapidly or abruptly.

Paralyses, contractures, generalized or localized in one limb, *astasia-abasia*.

Tremors, reproducing the infinite varieties of emotional trembling, of which they represent a fixation in the form of a sequela—this motor disorder having supervened upon the state of anxiety of which originally it was the expression.

Tics, of which the most frequent is a movement of the shoulder and jerking back of the head, expressing surprise (tic of surprise).

Cataleptoid attitudes, similar to those seen in catatonia.

Choreic movements.

Myoclonic contractions.

I shall stop here this enumeration which, as said a moment ago, could be continued indefinitely without exhausting all possibilities.

Whatever the localization or form of these symptoms, we are dealing with functional disorders based on *auto-suggestion*, in other words, *pithiatic disorders*. The auto-suggestion may have for its starting point one of the manifestations of the emotional

shock: such is notably the case with tremors and certain tics (tic of surprise); or a fortuitous impression which, overlaid by the emotion, is transformed into a fixed idea: such is for the most part the origin of paralyses, contractures, deaf-mutism, amaurosis, etc. One man, thrown by a shell explosion, sustains a slight contusion about the knee, and develops a contracture of the lower extremity on the affected side; another gets a grain of sand in his eye, and remains amaurotic for weeks; a third maintains complete deafness following a slight and quickly healed lesion of the ear.

These neuropathic symptoms may be associated with or take the place of purely psychic symptoms. In the first case the emotional psychosis becomes a *psychoneurosis*, in the second an *emotional neurosis*.

No greater importance should be attached to these distinctions in connection with the emotional war psychoses than with ordinary emotional psychoses, as they are based much more on appearances than on the nature of things. Emotional psychoses and neuroses do not represent distinct morbid entities, but different modalities of the same fundamental pathological state; the pithiatism which is the basis of the neuropathic symptoms is, indeed, nothing but a mental disorder which develops, like the component elements of emotional psychoses (asthenia, heightened emotional state, overactive imagination), upon a soil of emotional instability.

The *diagnosis* of emotional war psychoses should be based on the data of etiology (explosion or emotional shock) and upon the clinical syndrome, the characteristics of which are, as we have seen, among the most definite.

It should not be forgotten that a shell explosion can produce not only emotional phenomena but also, by secondary traumatism, concussion or fracture of the skull, and, by direct effect, cerebral hemorrhages. In these different cases the clinical manifestations are so entirely unlike those of emotional psychoses that an error could hardly be made, at least if one examines his patient carefully. Lumbar puncture alone, when the question is one of hemorrhage, establishes the differentiation. Here it should be mentioned that, as might be foretold from the purely psychic and functional nature of the symptoms in emotional psychoses, no important modification of the cerebrospinal fluid is found. In not one of the cases of so-called shell shock, *i. e.*, sufferers from shell explosion, which

have been examined on my service was there any increase of intraspinal pressure, or in protein or cell content. It is true that the patients were not punctured until long (several weeks and sometimes months) after the explosion. Lumbar puncture done immediately after the explosion sometimes furnishes a slightly albuminous or bloody fluid. These slight changes, transitory and *inconstant*, could have no direct relation to the symptoms as marked and often tenacious as those of emotional psychoses (pseudo-concussion). It is a coincidence and nothing more.

In the period of confusion it will be easy to eliminate mental disorders of infectious origin (febrile delirium, infectious delirium) by the absence of fever or any other symptom of infection.

It may be more difficult to differentiate between emotional war psychoses in the psychasthenic period and the post-infectious psychopathic states, particularly as the former are quite often seen following typhoid fever.

The defect phenomena (weakness of attention, incapacity for mental effort, amnesia of reproduction and fixation) are apparently the same. The surest differential sign is the heightened emotional state, which is always very marked in the emotional psychoses and much less in the post-infectious psychoses. Finally, the history should generally remove all doubt.

We need not dwell long on the differentiation from demetia præcox, which might be thought of on account of certain stereotypes, tics, and cataleptoid attitudes. A little attention will suffice for the discovery, beneath the appearances of stupor in emotional psychoses, of an exquisite hyperemotivity which contrasts radically with the indifference of catatonia or hebephrenia.

The differentiation between the functional disorders of pithiatism and corresponding *organic symptoms* (paralyses, contractures, speech disturbances, etc.), whether the latter be due to central or peripheral lesions, is established by the usual methods.

There can be no difficulty here except for *paralyses and contractures of reflex origin*, in which the disorders of motility, being out of proportion with the gravity of the lesion and independent, at least in appearance, of any anatomic systematization, resemble hysterical phenomena to such a degree as to have been for a long time confounded with them. The works of Ducosté, Babinski

and Froment, Guillain and Barré, Marie and Foix* have brought this confusion to an end. These authors have shown that the reflex paralyses and contractures differ from hysterical ones by their resistance to all suggestion and their association with a series of symptoms which suggestion could not produce (muscular atrophy, increase of mechanical irritability, softening of skeletal tissues, temperature changes, etc.). I would add that reflex paralyses and contractures are independent of emotional instability, which is the basis, as already said, of the suggestibility of pithiatism.

Upon the pithiatic nature of the symptoms being demonstrated, it remains to establish their etiological relation to the emotional shock, which is but a simple question of fact, easy enough to determine if one possesses a full history of the illness.

The finest points of diagnosis and, in some respects, the most important, are those arising in connection with the question of *simulation*.

Undoubtedly the disharmony, when the simulated state presents a certain complexity, the atypical character, the absurdity, the mobility of symptoms, would tend to expose the simulation, and in certain cases, where the simulator is particularly awkward, the diagnosis imposes itself. But it is not always thus. There are clever simulators who take note of all they see about them and very rapidly acquire an experience sufficient for a passable imitation of the emotional syndrome. Even tachycardia may be added to the simulated symptoms, and this is quite intelligible: the simulator is as likely as any one to be affected at the moment when he knows he is being examined, and this suffices to increase the beating of his heart. Finally, the disharmony, absurdity, and mobility are wanting when the subject simulates a monosymptomatic state: paralysis, contracture, deaf-mutism, etc.

*Ducosté. *Les deux lois des contractures dans les lésions des nerfs périphériques*. Gaz. hebdomadaire des Sciences médicales de Bordeaux, July 18, 1915. *Les syndromes cubitiaux*. Ibid., Aug. 15 and Sept. 5, 1915. *Les contractures dans les lésions nerveuses périphériques*. Soc. de Biol., July 24, 1915, Guillain and Barré. Soc. méd. des hôp., Jan. 21, 1916, Marie and Foix. *Sur une forme spéciale de parésie paratonique des muscles de la main*. Soc. méd. des hôp., Feb. 4, 1916. Babinski and Froment. *Contractures et paralysies traumatiques d'ordre réflexe*, Presse médicale, Feb. 24, 1916, No. 11.

In these cases simulation cannot be established except upon two elements: *confession* (accompanied, of course, by disappearance of symptoms) and the subject being caught *flagrante delicto*. (Roussy.)

The one and the other are in the end equally convincing. Catching the subject in the act, in other words the detection of unquestionable fraud—for example, a subject claiming to be paralyzed is caught walking normally, a total amnesic reminding his comrade that he has long owed him a franc, a deaf subject who blinks his eyes upon a pistol shot—establishes the diagnosis of simulation. The same is true of confession—or, what is equivalent, a cure sudden and without cause, which may be considered a tacit confession. To my mind it is best to combine the two and, even where a man is caught in the act, to make every effort to obtain a confession, even at the price of a formal promise of impunity. This is the method recommended by Sicard. It seems to me excellent. It is in fact the only one which makes indulgence practicable; for the mere catching in the act, without confession and with persistence of the simulation, renders prosecution imperative. It is better from every point of view to send a man back to his company for duty than bring him before Court Martial.

The natural *course* of emotional war psychoses, as of emotional psychoses in general, is toward recovery. It is necessary, however, to make some reservations.

I have seen, in four cases, chronic psychoses follow an explosion of a projectile or a mine: two general paretic syndromes, classical in their clinical manifestations, one dementia præcox, and one chronic hallucinatory psychosis. It is quite possible that in cases of this sort we are dealing with simple coincidences. An individual about to develop general paresis, dementia præcox, or a chronic hallucinatory psychosis may, like any other, become the victim of a shell explosion and show emotional phenomena. As the latter disappear, the signs of the chronic psychosis appear and develop. If the explosion has played a part in the etiology, it is infinitely probable that the part is but a contributory one. It has but opened the way for a morbid process long prepared either by an infection (syphilis), or by a constitutional predisposition, or by any other pathogenic factor. This interpretation

would be almost incontestable as far as the general paresis cases are concerned, if it had been demonstrated that the "shell shock" cases which had turned into paresis had had syphilis. Unfortunately in the two cases which I observed I had but scant personal histories and it was not practicable to do Wassermann tests.

However that may be, nothing in all that we know of the etiology of mental diseases would justify the proposition that a purely emotional shock or an explosion could have for its consequence general paresis, dementia præcox, or a chronic hallucinatory psychosis. One might at most attribute to it the value of a contributing cause, but one could go no farther than that.

It is conceivable that an emotional war psychosis, like an ordinary emotional psychosis, might develop into a delusional state centering about a prevailing fixed idea.

In such a case the idea of damage sustained through an explosion or any other cause would become the fundamental fixed idea upon which the delusional state would develop. I have as yet not met with a case of this sort and I know of none published in the literature. But it would surprise me if such cases did not develop. It is probable that they will be seen springing up after the cessation of hostilities.

Finally, it should be recognized that there are patients in whom the syndrome characteristic of the second period lasts a year or longer. I know a case of emotional psychosis—by purely emotional shock—which has lasted over two years without any appreciable improvement or change. Is it, then, possible for the course of emotional war psychoses to be toward incurability? I should withhold an affirmative answer. I should even say that I do not believe it.

There exists at the present time a factor by which the prognosis of emotional war psychoses is radically biased: it is the war itself. The prospect of returning to the front constitutes, for many of the emotionally unstable, an obstacle to recovery of such power that it is impossible to say if it alone might not suffice to keep up the neuro-psychic symptoms and to impart to the disease the appearance of chronicity which has been noted in some cases. The fate of these patients will not be settled until peace has been signed.

Emotional war psychoses raise certain *medico-legal problems*. The commoner ones—aside from simulation—are those of refusal to obey orders, assault, being absent without leave, and desertion. As stated above, the period of confusion is most fertile in manifestations of this sort. It goes without saying that, the diagnosis being once established, the subject's irresponsibility follows.

The diagnosis is simple when the medical examination takes place before the disappearance of the symptoms of confusion or when one is in possession of exact information concerning the mental condition of the subject at the time of the alleged criminal act: such is the case in assaults or refusal to obey orders, where the nature of the reaction itself generally brings in at once the intervention of others. But it is not always so when we are dealing with a fugue resulting in absence without leave or desertion. By the time the man is arrested or presents himself before the military authorities the confusion has generally vanished and there is no gross and evident mental disorder to indicate at once the pathological nature of the act.

In such cases one should make every effort to reconstruct by all means at his disposal the starting point and course of the fugue: minutely detailed questioning of the soldier, information from his organization and from the different places through which he passed, careful investigation of the least clue. But one should especially take account of the subsequent course of the symptoms. It is very rare for an emotional psychosis to end with the disappearance of the symptoms of confusion. In the immense majority of cases one has before him the psychasthenic period, the clinical features of which, as we have seen, are among the best defined and readily establish the diagnosis.

I have seen several cases in which the existence of the syndrome of asthenia, heightened emotional state, and overactive imagination indicated with certainty the pathological character of a fugue, as to the nature of which, owing to lack of sufficient data, it was impossible to form a judgment.

It is not to be denied, however, that there are cases in which doubts remain, especially when the history is either lacking or not explicit and when the physician has not had an opportunity of examining the subject until after the complete disappearance

of symptoms. One must then make up one's mind "to know how to doubt, to dare to say that one is in doubt" (Thoinot)—which is a necessary attribute of an honest medico-legal expert—and, upon presenting the case in all its complexity, to leave the decision to the military authorities; such decision must surely be an indulgent one, as the doubt cannot be otherwise than favorable to the accused.

The *treatment* varies, naturally, according to whether the disease is in its first or second phase.

In the first phase—rest in bed, quiet, reconstructive medication: the treatment here suggests itself.

The indications are not so simple in the second phase, which we have designated the psychasthenic period.

At first these patients were treated like ordinary psychoneurasthenics, that is to say, medically, utilizing all the dietetic, medicinal, and physical therapeutic resources available to medical art. Now, it has happened that in the medical organizations at the front, where the equipment is necessarily meager, the patients recovered rapidly and, in the majority of cases, were at the end of a few days well enough to rejoin their company; whereas in the hospital units in the rear, which are far more completely equipped, in spite of diets, douches, and electric currents of all forms and all strengths, the symptoms dragged on tediously, the patients remaining months in the hospital and often, after a cure obtained with difficulty, relapsing either in the course of convalescence or shortly after return to duty.

This experience has been constant and, though apparently paradoxical, is readily explained.

First of all, that which has been found in ordinary emotional (pseudo-traumatic) psychoses holds true for these victims of the war. A treatment which is too medical, if not followed by prompt and notable improvement, results in anchoring in the mind of the patient the notion of a grave pathological condition and in the development of hypochondriacal tendencies which are so often a part of the emotional syndrome, whether the latter be due to a common occurrence in ordinary life or to an event of the war. The idea of a grave pathological condition becomes quite naturally associated with the idea of damage sustained for the future as well

as for the present; and just as a subject of an accident in times of peace can become obsessed with the preoccupation with indemnity to be turned over to him, so the subject of a war accident, exaggerating, like the first, his physical and mental damage, worries about the future, is often upheld in his hypochondriasis by ill applied commiseration of those about him and the more or less interested pessimism of his relatives, and ends by hypnotizing himself with thoughts of retirement and pension: these then become obstacles to recovery, and in this way develops a *sinister* war case, in every way comparable with the sinister cases of ordinary accidents.

But aside from factors causing aggravation or preventing recovery, which are common to all sinister cases of whatever origin, we have to consider, in connection with emotional war psychoses, a factor peculiar to them alone. Recovery means more or less prompt return to the trenches. This prospect appears natural to the soldier who has remained at the front. It is otherwise with the one who has been evacuated to the interior. "By keeping the patient at the front one leaves him in the atmosphere of a combatant, in contact with the features which impart to this atmosphere its peculiar character: simplicity and sometimes even restricted conditions of material existence, rigid discipline, close proximity of danger. He remains in the environment to which he has, more or less fully, become adapted. By evacuating him to the interior one breaks this contact and destroys the adaptation. When, upon recovery, he returns to the trenches, he has to *readapt* himself. One can conceive how this re-adaptation, painful for many, may prove impossible for some. It will prove impossible notably for the emotionally unstable in whom a morbid imagination stirs up, amplifies immeasurably, and converts into obsession tragic spectacles of the war, causes him to live over again the fears once experienced, and projects into the future the terrors of the past. This is true of the graver cases of shell shock and explains the fact that recurrences occur almost always at the end convalescence or shortly after returning to quarters, yet without one being thereby justified in speaking of simulation. The subject sees himself on the way back to the trenches and, owing to an emotional and imaginative erethism, this perspective revives the elements of the shell shock syndrome."

This is the explanation at which Ballet and I arrived in our work published in *Paris Médical*. I am more than ever convinced that it is the true one. By keeping the patient at the front "one avoids a disadaptation and eliminates the necessity for a readaptation." Therein is all the secret of therapeutic success obtained in the medical organizations at the front.

Accordingly, subjects affected with emotional psychoses should be kept on psychiatric services at the front. The confused phase once passed, and the patient having become lucid and accessible to favorable suggestion, he must be convinced that he *is due* to get well, and that because he is due to get well he is not evacuated to the interior. This psychic therapy, associated where necessary with medication or such physical therapeutic means as may be available under the conditions (cacodylate in general weakness, electricity in deaf-mutism, paralyses, and all other pithiatric manifestations), will lead to a rapid recovery and an early return of the soldier to his company.

Nevertheless, there will always remain a certain number of subjects who, by reason of a particularly marked emotional instability, will not get well quickly. The first indication in these cases is to segregate them from the others, on whom they can have but a deplorable influence, or if their isolation is not readily practicable, to evacuate them.

The hospitals in the interior will consequently continue to receive victims of emotional shock. They should be treated as patients, but as nervous patients, subject to military discipline, and not as insane and irresponsible for their acts.

Noisy or dramatic manifestations, particularly hysterical crises and somnambulism, necessitate absolute isolation, in the first place because imitation by others must be avoided and the patient must be prevented from teaching others by his example, and further because absolute isolation constitutes in such cases a treatment of sure efficacy. I, for one, have never seen hysterical crises resist rigid isolation.

In the interior, as at the front, the principal part in treatment falls to psychotherapy:¹⁰ The patient must be convinced that the

¹⁰ J. Déjerine and E. Gauckler. *Le traitement par l'isolement et la psychothérapie des militaires atteints de troubles fonctionnels du système nerveux*. Presse médicale, Dec. 30, 1915, No. 64.

symptoms which he presents are curable, quickly curable; he must be made to note the progress he has made; and he should be granted privileges he asks (visits, walks, participation in common amusements, etc.) only as rewards for further progress, and, as the crowning reward for complete recovery, a real convalescence. One should avoid, as the worst danger, giving him a glimpse of the possibility of retirement, especially retirement on a pension: this would but switch him on a sinister course.

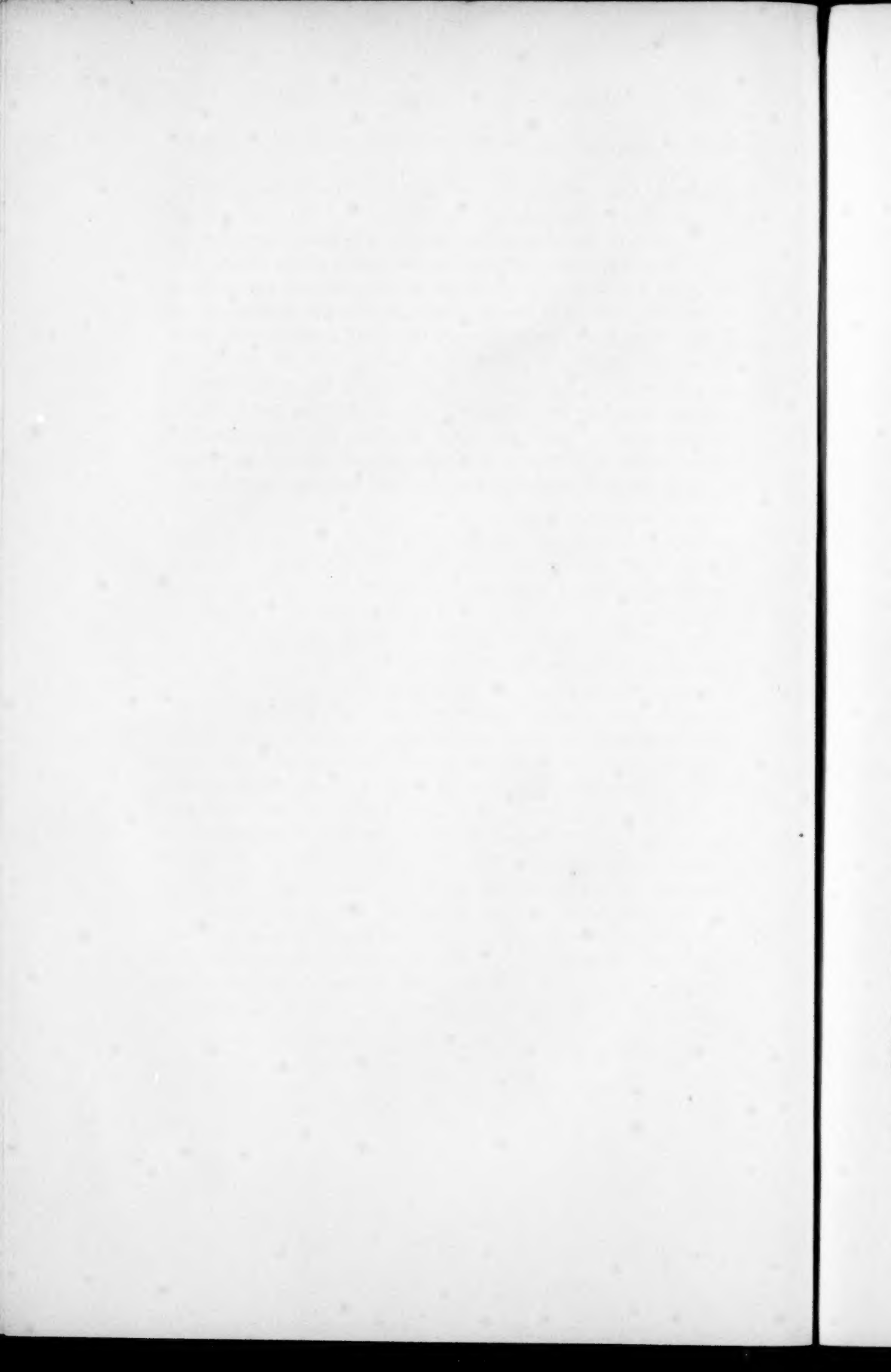
The patient, as has been said, should remain a soldier, subject to discipline. He should keep his uniform and maintain a correct bearing. He should remain in touch with superiors, towards whom he should observe the same deference as if he were normal. Finally, as was very properly recommended by Grasset,¹¹ he will gradually be placed on the road back to a soldier's life, by being made to take part in military drill in formation under command of non-commissioned officers. This military therapy—the association of these two words has nothing in it that is shocking—is essential. It is enough that the soldier has lost his adaptation to life at the front. It would be a grave error to let him lose also his adaptation to military life.

When the pathological condition has lasted many months, when the emotional balance remains gravely affected, and when hope of an early cure has to be given up, what course should be taken?

Retirement should not be considered. Indeed, what form of retirement could here be applied? One could not think of Retirement No. 2 for a condition unquestionably caused by the war. Nor could one resort to Retirement No. 1 with pension for a condition which has all the chances of cure once the war is over. As to temporary retirement, it is no longer used in such cases: temporary retirement assumes, in effect, that the patient might be cured at the expiration of his retirement period, but we know that he will not if the war is then still on. The patient must, therefore, be kept in the army. But he must also be eliminated from hospital wards where his presence constitutes for the really sick a cause of discouragement and for the others encouragement in persisting. What then should be done? Certain subjects, when

¹¹ Grasset. *Le traitement des psychonévroses de guerre*. Presse médicale, Oct. 28, 1915, No. 52.

sufficiently improved, can be transferred to the auxiliary troops. This solution commends itself particularly for the older retired men or men of the old auxiliary troops who have been—though to but a slight extent—brought into the service of the army. For the others, for those who retain grave symptoms and must still be in institutions, it will be best to provide services for chronics, a sort of lazarettos, where they might be kept until a solution for their case might become available, that is to say, until the end of the war. However, it is probable that if not more than a minimum of emotional psychoses are evacuated into the interior and if, in the hospitals which receive this small number, the authorities will proceed with firmness and prudence, this remnant of incurables or, more correctly, pseudo-incurables, will be quite limited.



THE INSANE PSYCHONEUROTIC.

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It is axiomatic that the border line between sanity and insanity is very difficult to draw, but the distinction between insane and not insane is much complicated if there exists in the patient any mental disease—psychopathia, psychoneurosis or psychosis. The question of insanity is a legal matter—one of evidence and law. To the law one is insane or sane—the dividing line (however uncertain the medical or other definition may be) is absolute.

Among the psychoneurotics one finds not infrequently cases in which there can be very little doubt of insanity in the legal sense—cases such that, by reason of their mental state, anything approaching a normal conduct of life is impossible. Their conduct is “socially inefficient” (White), and due to a mental disorder. In many such cases there is a definite doubt between psychosis and psychoneurosis; in other words, the differential diagnosis is very difficult. Some cases which seem purely psychoneurotic run a definite course with recovery, much as do the manic-depressive cases. In many of these there is a very real danger of suicide; others have other complicating factors, some of which will be pointed out. Study of this group seems to bring out more clearly than in any other the great importance of a thorough analysis of the entire life of the individual, since it is only by this method that the sequence of events can be correctly obtained, the primary and secondary phenomena in the mental state determined, and the causes for the mental maladjustment laid bare.

Because of the practical importance of these several points, ten cases illustrating various phases of the question have been chosen at random from the records of the hospital; limiting the choice to cases in which psychoneurosis was important in the diagnosis, and

¹ Contribution from the Psychopathic Hospital, series of 1918.

the cases either ran a manic-depressive course, were insane in the legal sense, committed suicide, or the differential diagnosis was obscure. All of the cases have been thoroughly studied, and all but one presented at staff meeting, which means that a great deal of time was spent in working out the case—so the opinions recorded were not formed in haste, but were subject to considerable debate and correction by the entire staff.

Merely for convenience, the cases have been taken in the order in which they appeared at the hospital. Many more could be added to the list, but without revealing any additional information.

THE CASES.

CASE I.—A successful business man, 48 years of age, salesman in the furniture business, constantly advancing in his salary until within two years; married, with two living children. No history of lues, but gonorrhea at 39. Heavily alcoholic until eight months before admission.

He first came to the out-patient department of this hospital January 3, 1916, when he said that about three years previously he had a period in which he was somewhat agitated, miserable, had numbness in the head, dull headaches and dizzy spells. People moving about confused him. These had continued more or less until the time of his visit, when the symptoms were somewhat worse. Physical examination was practically negative. He continued to visit the out-patient department with some relief, but finally entered the hospital voluntarily on July 5th, at which time he was depressed, emotionally unstable, and much worried over his physical condition. He showed no major psychotic symptoms; complained a great deal of nervousness, of a fear of sickness; was worried; emotionally unstable; somewhat depressed. No delusions; no hallucinations; no loss of memory. He thought that he might be dwelling too much upon his physical condition. A week later was pleasant and cheerful, not anxious, and in fairly good condition.

Physical examination was practically negative. Partial deafness of right ear. No other abnormal neurological findings. Blood-pressure 128-70. Urine negative. Wassermann reaction on the serum negative. He was discharged to the out-patient department, and on October 17, 1916, on the advice of the out-patient department physician, he entered a state hospital as a voluntary patient.

In the meantime his wife had complained that several times he had sharpened knives apparently with intent to commit suicide. His wife gave a family history of both grandfathers being insane, and an uncle and sister insane. The patient knew nothing of his grandparents. Said his mother was inclined to be hypochondrical, and thought that some of her people were insane. He had a feeble-minded sister.

At the state hospital the patient laid his trouble to the fact that another man had been showing his wife attention for about three years, that fol-

lowing this he began to drink, and gradually fell off. He had become jealous of his wife and an old gentleman who had been helping to care for the family.

Orientation was correct. No impairment of memory. No evident deterioration. No hallucinations. Complained of one of his ears being blocked, and that he had more or less stomach trouble. Emotionally somewhat depressed. Physical examination negative.

He remained hypochondriacal until about a month before leaving the hospital on March 17, 1917, when he began to improve, to do some work, and to talk less about himself. He went home on March 17th, and on March 22d was brought again to this hospital by the police, *because of an attempt at suicide on that day*. He was said to be very despondent, as he believed he would become a burden for his wife and children, since he thought he had had attacks of paralysis.

It appears that on the morning of the 22d, while his wife was out, patient beat himself on the head with a cold chisel. When he did so it did not hurt him any more than "if his head were a block of wood." He had linear lacerations, ten in number, which did not extend through entire thickness of scalp. There were also two parallel superficial scratches running transversely across the neck.

At the time of the admission he said that, "all the mucous membrane is gone in my mouth. I can talk and think all right, but my body is dead, all except my heart, my saliva is gone, and I have pus instead." He took off his shoe and stocking to show that the foot was dead and cold, although it was warm and of a normal appearance. He was correctly oriented. Realized that he was despondent, thought he was very weak, not strong physically, had not been unconscious. Felt somewhat depressed because he thought he had gotten himself into serious trouble, at the same time laughed about it. While he felt that his body was dead he knew that it was unreasonable, and could not be true, nevertheless it seemed to be so. He could be temporarily reasoned out of his ideas, but at once would begin to feel again that they were real. No memory defect. No other abnormalities. Mental level that of a normal adult. Continued to do fairly well, and was committed to a hospital because of his attempt at suicide. Patient denied ever having been nervous before he began to drink; found that drinking affected him very much. At times felt as though he were very light in weight. Complained at times that his head did not have the proper control of his body. Explained the pus as due to some local condition in his nose. Did not sleep very well; tired very easily.

The discussion of the diagnosis brought out that the differential diagnosis between manic-depressive psychosis and psychoneurosis is rather unsatisfactorily presented. "Neurasthenic symptoms can

be the first symptoms of different psychoses, chiefly of manic-depressive and dementia præcox. A neurasthenic patient shows irritability and depression, because he notices that his efficiency decreases. As soon as he takes a rest he becomes better. The manic-depressive case has uneasiness and depression without apparent reason, which cannot be changed by cheering him up. The neurasthenic is suggestible and will believe you; the manic-depressive remains pessimistic. Changes in the neurasthenic condition happen under the influence of outside factors; in the manic-depressive without definite reason." (Abstract from Kraepelin.)

The diagnosis lay between manic-depressive psychosis and psychoneurosis; if the latter, possibly a constitutional state lighted up by alcohol.

The symptoms seemed to be those of psychoneurosis, with secondary phenomena of depression—the whole making a state in which the patient was dangerous to himself, and practically inefficient.

Because of his suicidal attempt, and the very real danger to himself thus indicated, he was committed. At the hospital to which he was sent, the diagnosis was left unclassified. His condition has improved and he is working, but he has not yet recovered. It is possible that the neuronc damage due to his alcoholic excesses will prevent the return to a normal level of activity.

CASE II.—A Jewish man, born in Roumania, was sent to the hospital by his physician on February 8, 1916, because he had been worrying for the past year, and had become very nervous and fretful. Suffered a great deal from headaches and dull pains over the face. He was removed from the hospital the next day so an adequate examination was not possible, but certain facts were obtained.

On January 1, 1916, patient took examinations for the bar for the fourth time. He was sure he had not passed because his head felt bad, but had not received notification. He had been very nervous, there was insomnia, and a good deal of headache; for a few days he had been rather depressed. Correctly oriented. Attitude of a depressed person. Denied hallucinations and delusions. There seemed to be no impairment of the memory. The first three times he took the bar examinations he had felt that he should pass, but he did not do so; the last time he took them he was quite certain he had not passed. Following this he became more and more depressed and worried.

The physical examination was approximately negative, aside from some tonsillitis and adenitis. Wassermann reaction on blood serum was negative.

In March the patient was notified that he had passed the bar examinations. He became very active and joyful, and *suddenly became blind*. Treated for this at a general hospital, a diagnosis of "hysterical blindness" was made, and he was cured suddenly and completely by pressing a pencil against the eyeball, assuring him that when it hurt sufficiently he would suddenly see. He then continued his over-activity; engaged in the practice of law, hired expensive offices, but in May suddenly lost his speech. Sent then to a sanitarium where he was mute, except for the repetition of some incoherent syllables, although he observed very accurately, and attempted to explain things in pantomime. At first he could not write, but after several weeks he gradually began to do so, and in July could write coherently and extensively. A philanthropic woman, who had been much interested in him, came frequently to see him. To her he one day wrote on paper that if she would permit him to address her by her first name he thought he could talk. To this she finally consented and forthwith he spoke, and talked voluminously. On July 23d he left the sanitarium, and attempted to practice law again, entering a political campaign as representative of his ward.

During the fall he got along only fairly well, but in January, 1917, he had a crop of boils. During this period he would fall into deep and long slumbers. His parents then took him to the New York hospitals; he was observed at Bellevue, transferred to Central Islip, from there to the Manhattan State Hospital, and from there to the Psychopathic Hospital. At the Manhattan State Hospital physical examination revealed no neurological symptoms nor hysterical stigmata. No hallucinations nor delusional ideas, no symptoms in the fields of orientation, memory, intelligence, etc. He was reserved and evasive, at times somewhat anxious, admitted a previous period of depression, loss of eyesight, and a complete loss of speech.

Readmitted to the Psychopathic Hospital on March 27, 1917, at which time a fairly satisfactory history was obtained. Patient had worked very hard for his education; was married at twenty, and his wife helped him through law school. His loss of speech was first noticed in April, 1916, and continued until some time in July. In January, 1917, he realized that he had "bitten off more than he could chew," as he stated.

The family history was essentially negative; otherwise the information is that which has already been given.

The patient's memory was unimpaired. He was somewhat depressed, but not markedly so. Gave a good history of his previous difficulties. His last depression came because he did not have as much business as he should. Began to fear he could not provide for his family. Became tired, slept a good deal. Went at his mother's suggestion to be examined at the New York hospitals. Made some trouble there because his mother left him. He was quiet, orderly, accessible, no evidence of hallucinations or delusions. Spoke of the bad influence of being with the insane; thought that this was hard on his mind. Was not especially egoistic; was somewhat worried, and cried easily, but later denied being depressed. Insight good; somewhat suggestible.

The diagnoses to be considered were dementia præcox and psychoneurosis. For dementia præcox there was very little, except that one sometimes got from him the impression of dementia præcox. The analysis of the facts of his entire life, however, would indicate that it was a psychoneurosis (hysteria). There had been no suicidal attempts, nor had he seemed to think of such. A diagnosis of not psychotic was made.

Patient was discharged to the out-patient department on April 5, 1917, and on April 17th *committed suicide by hanging*—evidently with a return of his depression.

Here, then, is a rather definite history of prolonged worry and overwork, with several obviously hysterical episodes. *Secondary* to the psychoneurotic manifestations came *depression*, and apparently to the return of such depression is to be ascribed the successful attempt at suicide. The case indicates clearly that where there is much depression in a psychoneurotic we should be very careful about releasing the patient from observation.

CASE III.—A young man of twenty-four, whose father was Hungarian, and his mother (who was very neurotic) English, was born in this country; is single; a Protestant; a clerk and music student. He came voluntarily to the hospital on June 15, 1916, suffering from insomnia, profound depression, and occasional thoughts of suicide. He was oriented; answered questions intelligently; had no delusions nor hallucinations and was not alcoholic. He had at times imagined that when he was playing the piano the audience commented unfavorably on his looks, character, or playing, or all of these. About three months before, while writing in the office, he became unable to go on. He felt something snap in his head, he trembled, and felt numb all over. This had been preceded by much worry over social, family and business affairs.

There was no memory disturbance. Patient graduated from the Mechanics Arts High School at eighteen. He was an accomplished pianist—had had to go to work because of his father's death, and had worked as a clerk. He had found his work distasteful, and had always worried about it. He had an attack of grippe in November, 1915, following which he was nervous, lacked energy, was less alert, and found his memory not so good. He had headache and some insomnia, and distressing dreams frequently of a sexual character. He became more self-conscious, felt that he did not play so well as formerly, and this caused him to worry and become more depressed. He expressed some ideas of reference (some of which have been stated above), and in addition he thought that his boss was down on him because he was uneducated, and feared that patient might get his position. He was sure his appearance had changed, and that people had noticed him on the street because of it. He showed emotional instability, weeping rather easily.

The physical examination was negative, except for a rather low systolic blood-pressure—104. There were no abnormalities in the neuromuscular system. Urine negative. Wassermann reaction on serum negative. Spinal fluid negative.

On the Point Scale he graded at normal, with no irregularities. He continued to worry some—to be rather unstable—was finally discharged to the out-patient department as not psychotic; psychoneurosis; (?) of dementia præcox.

On June 25, 1917, he returned voluntarily to the hospital. Imagined that he was dying, and shaking from the knees up to the chest. Thought his mother was dead. Said he had various kinds of mental diseases; that he heard people talking about him, and saying bad things about him. He was correctly oriented; there was no memory defect. School knowledge well retained. He still felt that people were criticizing him unfavorably when he was playing; that his playing was poor; and that he must look queer and excited, because he was so nervous. No delusions of persecution or grandeur. He named a great many types of mental diseases which he thought he had; thus, because of his numb feeling he was sure he had dementia præcox or general paresis. No actual delusions could be made out. He seemed depressed and fearful, wept easily. Rather restless, walking up and down a great deal. He remained in this state, rather weak and listless, complaining that his mentality was below par, that he was helpless; seemed depressed. No amount of explanation or suggestion could rid him of his ideas. His heart became weak, then he thought his organs were disconnected, that his existence was merely physical or mechanical, and he could not really be encouraged. It was necessary to commit him, and he is still in the hospital to which he was committed.

He was presented at staff meeting with the diagnosis of psychoneurosis. He had marked and variable somatic delusions, and difficulty in thinking, so that he felt at times that he had lost his mind. He explained, for the first time, that he had the fear that he had syphilis, and that this was what gave to him the fear of death; but reassurance that he did not have syphilis was not sufficient to break down the train of ideas.

The diagnosis was very easily reduced to dementia præcox, manic-depressive, and psychoneurosis. There were no definite hallucinations; there was a good deal of scattering of interests and mental processes; he was somewhat apathetic; not deteriorated; and without much impulsivity. The definite relation of the sexual ideas and disturbances and bodily sensations all seemed more likely referable to psychoneurosis. This diagnosis was compatible with the feeling of inadequacy, the absence of definite depression, and the ideas about his physical condition. On the other hand, his train of thought could not well be followed—he had somatic and nihilistic ideas; he did not show the characteristic

earmarks of psychasthenia, nor of hysteria, nor altogether of neurasthenia. The staff were about equally divided between dementia præcox, manic-depressive, and psychoneurosis; with perhaps some leaning in the direction of psychoneurosis.

An overlooked point in this case was the low blood-pressure. It has been rather clearly shown in the war work that many cases of a psychoneurotic nature, with fears and tremblings, and even somatic ideas, are much relieved when their already low blood-pressure is brought to a normal level by the administration of pituitrin. Such observations are not yet numerous enough, nor have the cases been followed far enough, to make out that such improvement is permanent. Nevertheless, all such cases should receive the benefit of the doubt, and have this type of treatment, in addition to hydrotherapy and psychotherapy. Thus in many cases the more important fears and tremors may cease to have their well-defined physical effect.

Because of the impossibility of caring for him outside an institution, it was necessary to commit him. At the hospital to which he was sent, he is regarded as a case of dementia præcox, and his condition remains practically unchanged.

CASE IV.—A Jewish man of twenty-seven was sent into the hospital on February 22, 1917, with the statement that he had been ill for about two months, during which time he had been brooding, considered himself as wrong, and thought he was steering toward his destruction. He was eating and sleeping well, and complained of no pains nor headache.

The family history was negative. Patient was born in Russia; came to the United States in 1908, where he worked as a cutter, and graduated from a night high school. He was naturally quiet, efficient and well liked; had been secretary and treasurer of his union. He began playing the curb market and lost several hundred dollars in a stock transaction. He began to worry about this—made a few small mistakes and thought his reputation was ruined. On a doctor's advice he took a trip to New York, and there spent about three weeks in a sanitarium. Returning to Boston he took up his old work and did very well, although he would go home at night and tell his brother that he had made many mistakes, and that he must get away from Boston. About a week previous to entrance he attended a banquet and dance, enjoying himself very much. When he got home he began to tell his brother that he had been a fool to worry so much.

Mentally he was rather depressed at the time of admission; he had threatened suicide; but his depression cleared in about twenty-four hours, when he was quiet and agreeable and told his story readily. There was no memory disturbance, he realized that he had been depressed, and

that there was no cause for this depression, except a few small mistakes that he made. He talked a great deal about his trouble; his conduct was good; he was interested in his surroundings, and very sociable in his personal contacts. There were no hallucinations and no delusions revealed. Within a few days he realized that his trouble was that he took things too seriously. He was recognized as a very introspective type, and the mysteriousness of his ideas was apparent. He thought that people might have talked about him, but had never heard them.

The physical examination was completely negative. Blood-pressure 120-80. Urine negative. Spinal fluid negative. Wassermann reaction on the blood serum negative.

He was discharged from the hospital on March 2, 1917, as a case of psychoneurosis—condition improved. On March 11th he was returned in a depressed condition—had been blaming himself, thought he had made a fool of himself, that he had lost his reputation, and was doomed to downfall. He had been better for two days at home, then got worse, and although his work had been satisfactory he was so convinced that it was bad that he wanted to leave and go to Chicago. He said that his family did not think as much of him as they had. Thought he could not get along well because he had been here. People had been talking about him, but he had not heard them. He was indefinite in his statements; it was difficult to get him to talk directly. Thought his reasoning capacity had not been normal, and his mind was not working correctly. No ideas of persecution of any sort. At times he talked irrelevantly, and always argued in a circle. Sometimes he thought he would be better out of the way, but had not considered this seriously. He was not so good a man as he had been in the past. Was sure that people had talked about him because he did not act naturally, or as a normal person should. *Did not feel sad and depressed.* Thought his judgment was about 75 per cent normal. Related it all to his unsuccessful stock transactions.

He was very introspective; did not seem to be depressed; it was difficult to grasp his train of thought. Seemed to take less interest in his surroundings than before. He was superficially self-accusatory.

The staff meeting opinions were rather divided. Some thought he was a case of psychoneurosis, some of manic-depressive, most felt that he was not dementia præcox, although one or two thought it was an early præcox that would be of slow development.

Because of the uncertainty whether this might be the early stage of a præcox, because of the danger to his own life in his depressed phases, and because of the fact that he was unable correctly to order his life, all resulting from his mental disturbance, the patient was committed. By August 1st he had been discharged from the hospital to which he was committed with a diagnosis of manic-depressive (depressed), and condition on discharge as recovered.

Here then was a mild depression, with self-accusatory ideas; ideas of inefficiency and inadequacy—symptoms rather of the psychoneurotic than of the psychotic type, and all definitely related to a certain misstep in the conduct of his life—in other words, what we sometimes call a psychogenetic depression; the course of the disorder that of manic-depressive, with recovery in a few months.

CASE V.—A Jewish woman of forty-eight was sent to the hospital on May 2, 1917, because she was depressed, worried and had somatic ideas. It was not possible to obtain a very good outside history because of language and temperamental difficulties; but according to the history the patient had always been well up until the previous winter, when she began to show a certain amount of irritability. About six weeks before admission patient and her family moved to another house. Following this she was crying all the time. Claimed that she did not like the rooms, that the house was dirty, and her children were dirty—which was not true. Would sit in a chair most of the day, and shake her head constantly. Claimed she was going to die. Had never previously shown tendencies to worry. She claimed that she could not eat. No disturbance of sleep, but constantly agitated through the day. Had been losing weight. She was correctly oriented. There was no memory disturbance. Offered no complaints regarding her married life.

Claimed that her life was always full of trouble, but her trouble seemed to date to the marriage of her son, about five years ago. He married a Christian girl, and she seemed to think that this was the cause of her sickness. At the same time she admitted that, on the whole, her life was not unhappy. She denied any past illnesses; admitted always a tendency to worry.

She related her present illness directly to moving to the new house. This house was damp—she lost her appetite, had trouble with her nose and ear. Did not feel sick, but she worried. Claimed that her children were dirty because she was weak and could not care for them. She complained about everything in the hospital; for instance, did not like the food but would eat. No hallucinations; no delusions. Her attitude was that of a very neurotic person; she was not depressed; lively in speech and emotions; very talkative, talking chiefly about leaving the hospital.

The physical examination was not remarkable. There was some deafness of the right ear. Irregularity of the pupils, which reacted promptly. Blood-pressure 138-105; slight disturbances in co-ordination. The urine was negative; the spinal fluid was negative. Wassermann on the blood serum negative.

The diagnosis of psychoneurosis was made; patient was discharged on May 11th, and visited the out-patient department following that. For a time she continued to complain somewhat;

but in June her son entered the hospital—apparently a frank case of dementia præcox. The patient began to worry about her son, but all of her personal complaints had disappeared. In the meantime she had gained about fifteen pounds in weight, and was feeling perfectly well.

In other words, although the symptoms were psychoneurotic at all times, occurring in a very neurotic woman, the disturbance ran a manic-depressive course. At the present time, a year later, she continues well.

CASE VI.—A woman of fifty-five, of American descent, was sent to the hospital by her physician on March 31, 1917, with the statement that she was violent, excited, homicidal, at times depressed, "feels that she must kill her twin sister." "Breaks down and weeps about it."

Family history was essentially negative for the ascendants. One paternal uncle inclined to mild depression, but never suicidal. The mother had a "nervous trouble" at about sixty, with no mental symptoms. The twin sister has enjoyed good health, never had nervous or mental trouble; less excitable than the patient, otherwise temperament similar. Patient was very devoted to her twin sister, and both were very demonstrative. A younger sister had been in ill-health for twenty years. She had a middle ear abscess, and became ill with nervous prostration ("neurologist's diagnosis"); said to have some spinal trouble, has never had mental symptoms; not self-centered, not peculiar.

Patient was an average scholar; of good habits. Had not been much subject to depression until the death of a sister four years ago. Always somewhat apprehensive. Neither patient nor twin were self-reliant, both depended a good deal on an older sister. Patient has not been thought self-centered, had a good sense of humor. She has been the housekeeper of the family, the other sisters working. There has always been some anxiety about money matters; never any disappointment in love. Always very devoted to her twin, as was the twin to her. At the age of thirteen, for three months, patient was ill in bed, complained of severe vertical headache, was depressed, and at times imagined she was dying. In 1893, at the age of thirty-two, she developed the idea that she must kill her twin sister. Said the feeling started in her chest; she felt hateful toward her sister, and must kill her. She always found relief by going out-of-doors. At the same time she was as devoted and affectionate towards her sister as ever. Never made attempts nor threats, only complained of the feeling that she must kill her. At the same time there was a pain in the head. Recovered after three or four months. Morbidly depressed after the death of her father and mother, eighteen and twenty years since. In 1913 her sister died and patient was very depressed. All she could think of was that her deceased sister was "jammed up in hell," and that she was struggling to get out of her casket. Realized this was morbid imagination. *There was no*

feeling that she must kill the sister. This continued about six months. She then went away from home for a two days' visit, and returned fully recovered.

In the fall of 1916 there was some financial worry, and the patient was quite apprehensive. In January developed the idea that she must kill her twin. At times felt as if the twin "might be jammed up in hell." Very talkative, especially about the obsession. Said she talked to keep it off her mind. In February, when on a visit, became ill with grippe. In March, to a sanitarium where she stayed a week. Had a bad spell one night, was quite excited and noisy. Her idea persisted. Once when she repeated that she must kill her twin the sister said, "Go on, do it now, and we will have it over with"; the patient then threw her arms about her sister and said, "I wouldn't do it for the world." Complained of a distress in the top of her head like some one driving nails in. Sometimes wished she could die, never suggested suicide. Rather dreamy and absent-minded. Inordinate appetite. Insomnia; beautiful dreams. She was depressed; every second day the disturbing ideas were more insistent, and were followed by considerable exhaustion. No history of ideas of reference, of persecution, nor of hallucinations. No memory loss.

Here, the patient recognized her own condition very well. Complained of great pain and pressure on the top of her head; at times saw strange and terrible faces looking at her. Had never heard voices. Was well oriented. Her memory was unimpaired. Grasp on surroundings good. There was some question from her description whether she first became depressed and then developed the idea that she must kill her sister, or whether the obsession came first and the depression was a response thereto. Realized that this was a compulsive idea, and insisted that she did not want to kill her sister. She cried a great deal about it, and was very depressed over it. In the intervals when the idea was not so impellent her emotional tone was normal.

Physically she was well-developed and nourished. Pupils irregular, but reacted well. Arteries moderately sclerosed. Heart somewhat enlarged, with a blowing systolic murmur at the base. Blood-pressure 210-120. Tendon reflexes hyperactive. A slight tremor. Physical examination otherwise negative. Urine negative. Spinal fluid and Wassermann reaction on blood serum negative.

In about ten days she was pleasant, cheerful. The idea had disappeared, she felt normal, was willing to stay until we thought she might go. On the 19th of April she was discharged to her home, and the out-patient department.

It will be noticed in the history that all of the depressions really represent over-reactions to some reason for a depression. Apparently after the depression had started came the compulsive or obsessive idea, namely, that she must kill her sister. Such periods were usually of relatively short duration, but this does not necessarily argue against manic-depressive psychosis. On the other

hand, the fact that she realized the absurdity of the idea and its character, and that she never attempted to act upon it is an indication, at least to me, that she was not psychotic in the usual sense. The patient stated clearly, just before discharge, that, "I get depressed, and then I don't take interest in my work, and I suppose those thoughts come into my mind." It will be noticed that most of her depressions have been associated with the death of some relative or some friend. Her last depression was due to the death of a life-long friend of the family, and she explained the idea of killing her sister by saying that she thought of her own death and that she should not want to die unless her sister went too, as she loves her so much. At times this idea forms itself thus: "I want to die, death would be a relief, but I want my sister to go with me." She also tells of a depression when she did not think of killing her sister. She describes herself as a person who has blue periods and happy periods; in other words, a cyclothymic disposition.

At this admission the diagnosis seemed to be an atypical type of manic-depressive psychosis.

On October 1st the patient returned voluntarily to the hospital because she was depressed and obsessed with the idea *that she must kill both of her sisters, and must commit suicide herself*. An uncle had died two weeks previous to admission, and she had promptly become depressed, with recrudescence of the ideas. She was emotionally somewhat unstable, crying easily; was, on the whole, depressed. Was freely accessible; her depression was more subjective than objective, although she was somewhat retarded in her activity. Memory remained good. The additional idea was that she felt that she was going to die and must kill both of her sisters instead of one. This time the depression seemed in part, and the worryment entirely, due to this obsessive idea. She knew that she would not do it, and "it drives me nearly crazy with grief," to think that she should think such things. Felt that she was not worthy to live, and was surely going to die soon.

Within a few days she cleared up, was smiling and cheerful. The ideas had disappeared, and she was happily planning to go home. Discharged at the end of nine days in very good condition.

Physical examination unchanged. Blood-pressure 215-115.

This case may be summarized as one in which there are attacks of semi-depression, related usually to a cause, although the reaction is excessive. In the attacks of depression the patient feels that she herself is about to die, and because of her great love for her twin sister feels that she must kill her, so they will not be separated.

Along with the ideas and the depression there occur certain pains, chiefly referable to the head. There have never been any attacks of a frankly hysterical nature. The attacks are of short duration, and there never appear to be the obvious signs of a manic-depressive psychosis. Accordingly, this may be regarded either as a psychasthenia with obsessive ideas and depression, or as a mild manic-depressive condition. The association here of a very high blood-pressure, arguing a certain grade of arteriosclerosis, is very interesting. It has been shown that in manic-depressives arteriosclerosis tends to come early. In this case there is no evidence of any especial cause for the sclerosis, unless it be the manic-depressive attacks.

CASE VII.—A man of forty-two, of American descent, was sent to the hospital for thirty days' observation on May 12, 1917, because of "restlessness, periodical attacks of excitement—sullen, irritable. Hallucinations—fear."

The paternal grandmother died of cerebral hemorrhage, as did many of her family. A brother of the maternal grandmother died in a hospital for the insane, as did a paternal second cousin. The father, a quick-tempered, nervous, apprehensive man, is ill with arteriosclerosis at sixty-nine. The mother, age 70, has been in ill-health for five years with arteriosclerosis. One sister is nervous; stammers; had a "nervous breakdown," in which she "cried easily," at eighteen. The other sister is in good health.

The patient is the oldest of the siblings, born in 1875. He always stammered. As a youth was even-tempered, obedient, very sensitive, with very narrow interests. Although he attended school until he was fourteen, he never got beyond the primary grades (attributed to his stammering). Has never worked steadily or successfully. Used very little alcohol, never to excess; tobacco in moderation.

He attended public and private schools, then learned several trades, but has always had a great deal of assistance from his father.

At twenty he was married, and lived with his wife for eight or nine years. Separation was probably due to his failure to support her. Married again about a year since, after his first wife's death. During the intervening period had probably lived with his second wife.

Scarlet fever at five, followed by otitis and inability to walk for a time. Frequent attacks of tonsillitis. Eczema of head and chest persistent for a number of years. Vision always defective. Improvement in stammering during the last few years. A few years since a venereal disease.

At seventeen had a severe attack of grippe. For about a year not very well. Then a second attack. Soon after recovery he came to the house with a bullet wound in the arm, later admitting that he shot himself. At about this time he had two periods in which he became very much frightened, saying he was being chased, and once fainted. For many years had been

very cautious of his health. Always slept on the side he was advised was the proper side to lie on.

For about a year before admission he had seemed very peculiar to his sister. Had not worked, had wanted to be alone. Would not go out in the daytime, saying the light hurt his eyes. Complained much of vertical headache.

In 1916 thought he had a sunstroke. Since then had complained of much pain in the head and of visual failure. Would not see any one. Feared that people were looking at him. Felt as though there was a hole in his head where the "air blows in." No vomiting. Would throw himself on the floor and "act almost as if he had a fit."

Since August, 1916, patient had been treated by many doctors, all of whom stated that the trouble was mental rather than physical. They feared he might lose his memory. He imagined people were trying to get into the house. Would have fits of temper in which he would smash things. The door-bells in the house annoyed him so he quietly disconnected them. His eyes were in very bad condition so glasses were procured for him. Before that he would not ride in the street-car because he was so nervous. Felt that his head was moving up and down.

The patient had a reputation as an unusually strong man. It is said that in the past he lifted and carried pianos alone.

At the time of his first entrance he had lost about thirty pounds in weight. Physically, he showed a rash on the chest; profuse perspiration of the feet; slight tremor of the tongue; heart showed a blowing systolic murmur at apex, left base, and along vessels of the neck; brachial arteries visible, not nodular nor tortuous; blood-pressure 162-118; slight impairment of gait and co-ordination; a speech defect; a marked exaggeration of the knee-jerks; no abnormal reflexes; no impairment of sensation; urine negative; Wassermann reaction, serum and spinal fluid negative; other tests on spinal fluid negative. Eye-grounds—discs rather pale, left one shows irregularity of borders, but not distinctly abnormal. Non-protein blood nitrogen 42 mm. per 100 c. c.; phenolphthalein excretion 100 per cent in two hours; X-ray of head negative.

He was correctly oriented; memory fairly good—giving essentially the same story of his past as has already been given—could not give the exact date of his last marriage. Patient dated his present illness back about two years, during which time his eyes had bothered him. Some months ago the difficulty became very marked, his vision was so blurred that he could not see around the shop, and he became very much frightened by this. After he got his glasses he would only go out in the night, in order to get used to them, as he could not see well in the daytime. He had been to the Massachusetts General, City and Homeopathic hospitals for eyes and headache, and also for some urethral discharge. In addition he has had a buzzing in his ear. His nervousness showed itself by trembling, he said. He complained a great deal of loss of strength, of easy fatigue. Denied headaches; had not had any vomiting attacks. Never had any fainting spells. He showed no delusion formation. He could not explain why he

was losing his strength. He denied hallucinations to all forms of questioning. He had periods in which he was very anxious, was very shaky, trembling all over, and emotionally very unstable. Such spells did not last very long. At such times he had the fear of impending death. He showed no retardation; his associations were narrow, centering chiefly around himself; he co-operated very well. No conduct disorder. His attention was well held so long as the topic was himself. Expected a great deal to be done for him, was not capable of making much personal effort.

On the Point Scale he rated 11.6 years. He showed difficulty in grasping new situations. Did not concentrate his attention, so that his reproduction was poor. In the mechanical puzzles he was very clever.

The symptoms that this patient showed of agitation and apprehensiveness connected with the fear of death, a great deal of worry over trifling physical ailments, many of which could not be revealed, are all essentially psychoneurotic. Despite the history which seemed to point in the direction of delusion formation and hallucinations no clear evidence of this could be obtained from the patient. He had always been an inadequate person, neurotic from the beginning, who apparently did not get along very well in practical affairs. The combination of symptoms, which are essentially psychoneurotic, with a certain amount of depression, together with his distinctly abnormal conduct, indicate that the process is more severe than is usually the case in a simple psychoneurosis. The continually high blood-pressure of 160, with the diastolic ranging around 110; the emotional instability; the loss of weight; the confusion in recent memory, which is evident at times, all would seem to indicate the possibility of capillary fibrosis as the main factor in the case at the time of our study.

He was discharged from the hospital on June 12th, going to live with his sister. There for a few days he got along very well, was willing to meet people, and showed interest in things generally. For about one month before his second admission, on August 4th, his behavior was quite abnormal. He would go to the cellar and stay several hours. During the extreme hot weather he went to the attic and stayed for hours. On the very hot days he wanted a bottle of hot water on his head. Said his head was cold; thought an artery had died in his head. At times he thought his leg dragged, could not get it to go. Would enjoy working if there were doctors around. Wanted to return to the hospital. Complained of numbness in arms and legs. Would sit for long periods with his head in his hands, weeping.

In the latter part of July he told his sister that he was so discouraged he thought he would turn on the gas in the cellar, and end his life. He would not go out in the daytime; would not occupy a seat in the street-car with

his sister. At times thought he was dying, and wanted the ambulance, or the doctor, called. Would lie on a couch with his head hanging off, crying and moaning. Lost his way when on the street, and a police officer had to take him home. Had complained of diplopia. Came to visit the outpatient department, and remained in the hospital voluntarily (August 4th).

The physical examination was unchanged. Patient complained of headaches, weakness and nervousness.

He was correctly oriented, without particular difficulty in recent memory. Complained of his stomach—a feeling of discomfort which passed away when he lay down. Thought that keeping still would cure him without any medicine. Was more contented because he could read for hours with no headaches. Stated that he had first begun to worry about his eyesight, and now has various troubles. Explained away his bullet wound (of years before) by saying the revolver exploded accidentally. Also had explanations for the two periods when he was frightened many years ago. Complained of a *radiator* in the top of his head causing the feeling of discomfort. He was depressed; somewhat retarded. Emotional tone unstable. Talked at great length about his physical and mental condition. At this time his intelligence rating was 13.5 years on the Point Scale. Memory tests only fairly well done.

He continued with periods of anxiety and depression, often complaining of a terrible squeezing pain in his head. On September 22d he was feeling very well and was helping some about the ward. On the night of September 23d the patient called the nurse at 11.45. He had been quiet about fifteen minutes previously. When the nurse went to him it was found that *he had severed the superficial veins in both forearms with the top of a tobacco tin*, and was in a serious condition from hemorrhage. Although he claimed he was not attempting suicide, he had written various notes saying good-bye, not to blame the hospital, etc., indicating his intention of ending his life.

Following this he spoke of a considerable feeling of relief, the pressure in his head was not so bad, he suffered much less from headaches, but, of course, was weak for some time, due to the hemorrhage. However, it was not long before he was feeling weak and sick, had pains in the legs and in the back, and so on. On the 2d of November, while quietly talking, he suddenly grabbed at his face and clawed it, scratching himself rather severely. He gave as his reason the fact that he was feeling depressed.

Transferred on November 5, 1917, at which time there had been considerable loss of weight, and a continuation of the periods of agitation and depression.

The case may be summarized as follows: A man of forty-two, in whose family history are to be found cases of cerebral hemorrhage, and of psychoses; whose sexual habits and habits of work have been irregular; always regarded as a worrying, inadequate, neurotic and queer individual; a congenital stammerer. He has had many actual illnesses, and of late a severe eye trouble. At the

age of eighteen there was a probable attempt at suicide. For the past two years he has not worked. During this time he has had many headaches. He has preferred to stay in the house; has lost his way when he went out. Has markedly exaggerated his symptoms; has been agitated and depressed. There were no periods of dizziness. There have not been markedly present the cardinal signs of manic-depressive psychosis; no cardinal signs of dementia præcox; no evidence of syphilis or epilepsy; with no bodily disease capable of causing a psychosis of this type; but with a blood-pressure of 160-100. The intelligence rating seems to have been interfered with by his emotional state. Nevertheless, he seems to have been a constitutionally inferior person, with a very definite upset, in which a certain amount of deterioration has occurred. There were probable periods of confusion, definite periods of agitation, and some memory difficulty; a very definite attempt at suicide; with some somatic delusions uncommon in a psychoneurosis. The association of probable capillary fibrosis, hypertension, possible involutional factors, and questionable deterioration, all indicate a bad prognosis.

The favored diagnoses were psychoneurosis, and, later, manic-depressive psychosis with arteriosclerosis.

Following his transfer, there was some improvement, but lately (March, 1918) he has become more dull and apathetic and is reported to have auditory hallucinations. There has been some further deterioration, and he is regarded at the other hospital as a case of dementia præcox, although the grounds are not entirely clear. It seems much more probable that he has an organic brain disease of some type.

CASE VIII.—An English elevator operator of forty-six, came voluntarily to the hospital on May 14, 1917, complaining of depression, a feeling that he had lost his will, and anxiety. He had lost his position about six months previously, and had since become depressed; had tried to work, but could not; could not sleep; had thought of suicide, and twice turned on the gas, but was interrupted each time. He felt bad, cried easily; did not seem to be retarded, but to be very anxious; thought his mind was upset. He had made a trip to England, which did not relieve him. Had had a previous attack eleven years before, when he was for four days unconscious, he stated.

His mother-in-law stated that his father died in a hospital for the insane, and that a nephew had been fifteen or more years in a hospital for the insane. Patient was born in England; of limited education; of normal

habits, so far as known. He had very little sexual desire, and none for ten years. She regarded him as always a "regular sissy." Never cheerful, no sense of humor, very unsocial, of very narrow interests, always a steady worker. He had worked in one place for twelve years, during which time he had two illnesses, and his salary was paid. Directly after his last illness he went to the senior member of the firm and got his pay raised a dollar a week. A week later he was discharged (it was not until some time later that the real cause for this discharge was discovered, namely: that the patient had been found pilfering various small articles, and had been discharged on this account). Following this he had worked around in a number of places, but none of them were satisfactory.

Patient was married in 1904 and did not know that his wife was epileptic until the night after his marriage. Patient had never gotten along very well with his wife, had never been extremely interested in her. Wife seemed to think that her convulsions were intensified when he was around—and they had not been living together for about six months. Patient was always very affectionate toward his child, never toward his wife.

A week after his marriage, he attempted suicide with illuminating gas. He had lost his position, and was without employment. He wished to postpone his marriage until he got a position, but his mother-in-law urged him not to postpone it, and promised to give him \$500, which he did not receive; then he learned that his wife was an epileptic when he saw her in a seizure the first night after marriage. He did not threaten suicide, but attempted it. Was taken to the City Hospital, and was unconscious for several days. Following this there were no attacks of depression, until the one in which he came to the hospital.

He was operated on in September, 1916, for double hernia, and made a good recovery. Shortly after this was discharged from his position. He then became very nervous and depressed. He decided to return to England, where he would work and earn money and send for his wife and child in April, 1917. He returned to America in five weeks—said the war scared him to death, that he lived most of the time in a cellar through fear of Zeppelins. His sister gave him the money for his return trip. His wife was working in Philadelphia; he was eager to have her return, and finally in April she was persuaded to do so.

On Tuesday they began housekeeping—that night the patient walked the floor the whole night, and in the morning he was unable to work. He vomited and spat blood. On Friday this experience was repeated—the wife then refused to live with him and left.

Through all of this so-called depression, the patient had continued to try to work and had managed to support himself. He had spells when he felt nervous, and in such a spell he started for the hospital where he was operated on, and by mistake came to this one, where he was accepted as a voluntary patient.

The patient's story agreed practically with the story of the mother-in-law. He explained his attempt at suicide twelve years before by his depression and nervousness at that time; due, he stated, to the loss of a

position which had just suited him. His last spell of depression and nervousness he related directly to his discharge from his position, which he liked very much. No place that he could get suited him—in some the work was too hard, in others the pay was not enough. He worried constantly because he wanted his job back. He was oriented; memory good; no delusions nor hallucinations; considerable emotional instability; his thoughts were centered on his difficulties, and especially on the fact that he lost his very good job. He felt that if he got it back he would be perfectly all right. Reacted very markedly to any slight pain. Demanded a good deal of attention and treatment. His conduct was good.

Physically, he was fairly well developed and nourished. Teeth false. Heart negative. Lungs negative. Neurological examination negative. Blood-pressure 115-80. Urine negative. Spinal fluid negative. Wassermann reaction on the serum negative.

Rather against advice he was discharged to the out-patient department with the diagnosis between manic-depressive psychosis and psychoneurosis, in a condition somewhat improved. He was seen in the out-patient department, where he still had melancholic spells, was not able to sleep well, had many depressing thoughts, and thought a great deal of suicide. He worried about his job, about his wife and child. He worried because he did not hear from them, and did not see the child. Felt that he did not have the courage to kill himself. He was working for twelve dollars a week, and said he was too weak to try for other work. His effeminacy, his timidity, his self-consciousness were still present.

On June 19th he re-entered the hospital. This time he was worried over the family, could not sleep well, and he was very much depressed. He was rather anxious. No disturbance in the field of consciousness or memory. Possibly somewhat retarded, with a considerable number of hypochondriacal ideas; without definite delusion formation; without very good insight. Considerable emotional instability, weeping at very slight causes. His mental level was found to be 11.3 years on the Point Scale, with a very irregular examination—indicating that his mental state interfered with the correct rating of his intelligence. He began feeling better—did not seem so depressed—was very anxious to be noticed and talked to. It appeared that he had taken a job which relieved him from his former troubles, but did not stay very long because the place was not satisfactory in the end, and then all the troubles came back.

At this time he was presented at staff meeting, and from his general make-up and the evidence at hand, it was felt we were dealing with an inadequate personality of the psychoneurotic type, manifesting itself, particularly in the periods of strain, by depression, anxiety, emotional instability and attempts at suicide. Accordingly, he was discharged on June 29th, then in a somewhat improved condition. A job was found for him by the social service department, who took a great interest in him.

On July 12, 1917, he was returned to the hospital because his depression continued; he often thought of suicide; was weak and unable to keep his job. Mentally, he showed great indecision, was very dependent on other people—tried to excite sympathy by his stories—stated that he did not keep his places because he had not found one that was satisfactory. Had no sense of shame at his dependence—never showed initiative or particular interest in his surroundings, did not plan for the future, was chiefly occupied with his own past affairs. He realized that he was quite helpless and lacked backbone. Seemed to be fairly well contented with the rest treatment. He began to be quite pleasant—was rather anxious to get out. On August 11th, he was discharged, on the whole improved, to his family. Diagnosis, manic-depressive psychosis.

In this case both of the rather serious depressions came at periods when there was a definite cause for depression. It seems clear, from the entire conduct of his life and from the low-paid position with which he was satisfied, that he had a personality lacking in initiative, energy, ambition and the ability to withstand the stress and strain of attempting to attain success—in other words, that we have to do with an inadequate personality. Accordingly, the two attacks, of which we have record, appear to represent the reaction of his personality to the situation, rather than new causeless reactions of the type of psychosis. In other words, it would appear that we have to do with a psychogenetic state of anxiety and depression, which surely would not have arisen in a person of better make-up. It is probably stretching the use of the term psychoneurosis to put such a case in the psychoneurotic group. It is equally stretching the term manic-depressive psychosis to put such a case into that group. This is really a reaction state, arising in a person of inferior make-up, but one of a type which is often called psychoneurosis or manic-depressive psychosis. Certainly because of the disorder in the conduct of his life, which is directly related to the disturbance in his mental state, the man would be committable as a psychotic patient. For his condition, as presented in his admissions here, the prognosis is good, but, of course, the personality will always be defective.

He is, at present, getting along fairly well in a job which he has secured. He says that all of a sudden he became all right, and never felt better in his life than he does now—and this was directly related to his securing a satisfactory job—*i. e.*, the reactive nature of the attack is proven.

CASE IX.—A Greek, man, aged 34, was sent to the hospital on May 21, 1917, complaining of vague, indefinable pains, and a feeling that he was losing his mind, together with worry concerning impotence.

He was perfectly oriented for time, place and person, without evidence of memory defect for either recent or remote events, and without evidence of deterioration. There were no hallucinations; he had a fixed idea that he suffered from some very unusual nervous disease, which caused a lot of vague ill-defined pains. Concerning this he was rather depressed, but did not seem to be apprehensive. He indulged considerably in sensuous day-dreams, which amounted really to psychic masturbation. He complained also of eroticism when women passed him on the street, or if he went in bathing when there were young boys about. He dated his present illness to a day, about one year ago, when he went up in an elevator in an office building. He had a peculiar sensation in the abdominal region, which extended upward with a creeping, tickling sensation. About two months later he began to have dizzy feelings, and burning sensations in the stomach. These lasted only a short time.

During the past six months a great sense of fear when alone, so that if he went for a walk he would become fearful, and return home immediately. Had terrifying dreams when he put up a struggle for his life, but could not remember them clearly.

Emotionally, somewhat unstable; apt to break down and cry. He was quiet, and there was no history of impulsive or compulsive acts. No retardation or blocking. Conversation confined largely to his hypochondriacal ideas.

Physically, he was well developed and nourished. Neuromuscular findings normal. General physical examination negative. Blood-pressure 110-70. Urine negative. Wassermann reaction on the blood serum negative. Spinal fluid negative. He was discharged on May 30th, sent to the out-patient department of a general hospital for prostatic examination, to determine whether some of his difficulty might arise from enlarged prostate. This, however, seemed not to be the case.

On July 23d, he returned to the hospital voluntarily, at which time he was much depressed. He had been feeling weak, he had pain in his head and back, said he had lost his strength and courage, and cried easily. At this time he dated his difficulties much further back than at his first admission.

He had had the creepy feelings for about ten years. He had been told in Chicago, when he first came to this country, twelve years ago, that he had syphilis, and this has bothered him ever since. Had very rarely had intercourse with women because of the fear of gonorrhea or syphilis.

About three years ago he became much more erotic, and became disturbed by numerous erections in the course of the day; later on developed pains.

During the first six years of his illness he was able to work fairly well, but during the past four years he has been worried, rather anxious, easily tired, and his work has not been so efficient. It seems to have followed the

pain in the head, starting about four years ago. No history of a cyclothymic constitution. No hallucinations and no apparent deterioration.

At this admission he was very much more depressed, anxious and apprehensive. He did not show any great fear, did not react emotionally in a fearful way.

He was able to work for only a short time after leaving the hospital the first time, and his sexual symptoms of psychic masturbation, sensuous dreams, and longing for the society of women, restrained by his fear, have continued, and were rather worse. He thought his reputation was gone; that people thought he was crazy. In the course of telling this he broke down and cried.

It appeared that he had some formed delusions, which were rather difficult to get at because of language trouble, but he thought "there was something rotten in his stomach, that perhaps he had no stomach, that his intestines were gone." He thought his brain might be gone; he was surprised that he could talk; had been thinking so for some months. This, however, was not certainly made out, and it seemed that he thought his organs were there, but that he was sick. He was having some trouble that would make him crazy.

In his first admission every one agreed in making a diagnosis of psychoneurosis, but with the second admission, and the probability of somatic delusions, it began to appear that it might represent a dementia præcox process, which had had a long incubation period during which the symptoms were those of a psychoneurosis. On the other hand, others felt that it was manic-depressive psychosis—that with the marked exacerbation of symptoms in the year that had passed, we had to do with a disorder of the cyclothymic type, which would run its course and clear up. It seemed quite clear that he had been psychoneurotic for a long time. It was not quite clear that he had somatopsychic delusions. In combination with his depression and anxiety it seemed that his condition for the last few months was more nearly that of an anxious depression than anything else.

He was committed to another institution, where he still remains.

Clearly the ideas which the patient has are the type of ideas from which many a psychoneurotic suffers. Combined with this is a well-defined psychosexual disturbance, with a very real emotional conflict between desire and fear, which has resulted in the adoption of a middle ground of psychic masturbation and this particular method of repression appears to be the main causal influence in the present state. To be sure, one could not be positive that

this is not a slowly developing dementia præcox, but certainly this is not dementia præcox in the general and more correct usage of that term; unless, indeed, we are to class all cases as dementia præcox, which would be a travesty on diagnosis.

Clearly, also, the case is not to be regarded as a usual type of manic-depressive psychosis, with its relatively clear-cut affect disorder, combined with which there may be delusions—somatic or self-accusatory, more rarely paranoid. In this case the affect disturbance is secondary, and is dependent upon a host of other factors which in general we ascribe to psychoneurosis.

CASE X.—A man of forty-one has been known to charitable organizations for over three years. Previous to that he had been employed as a car painter, earning \$8 per week. His employers stated that they had never seen a man who was so anxious "to lie down on his job." He would be inactive for hours at a time, unless some one compelled him to work.

After about two years of illness, which physicians could not diagnose, he was, in 1915, sent to the North Reading Sanitarium for tuberculosis. There he improved quite rapidly, and, his family being under the care of the Associated Charities, he was examined from time to time at various out-patient departments to discover what his trouble was. One consumptive hospital found that what tuberculosis there was had been arrested. Light out-of-door employment was secured for him, driving a delivery team, but patient seemed to feel imposed upon when asked to do anything.

He was very irritable, would become displeased without provocation; his wife thought that at times he did not seem rational, that he talked queerly, believed that she had been pregnant and that she had been unfaithful to him, for all of which there was no basis. He threatened to poison the children, he threatened his wife's life, and he would wander around at night, apparently not in his right mind. Several times he threatened to jump out of a second-story window, becoming displeased over some slight matter. He brooded over pains, felt that he was a very sick man. His clergyman believed that he was just lazy, and that he had been demoralized by the state sanitarium, where he did not have to work; but it seems that he had been apathetic and unambitious for a long period before going to the sanitarium.

If any of his family became ill the patient developed a sympathetic illness, and seemed to suffer much more acutely than the one who was really ill. This was especially true at the birth of the children and during the term of pregnancy.

The patient came voluntarily to the hospital on October 27, 1917, at the suggestion of the social service department of a general hospital. Stated that he left the tubercular sanitarium because of nervousness. He could not sleep; had pains in the legs, and down the back, and in the head. These pains had been getting worse. He was too weak to work; easily fatigued;

there was a buzzing in the left ear. No hallucinations; no delusions. Somewhat depressed at time of admission. Said that he was subject to blue spells, when he did not care whether he lived or died. Not suicidal. Complained of a great deal of insomnia.

Physically, he was well developed and obese, had a red fissured tongue and red throat, and slight speech defect. Signs of some consolidation of both apices, and upper part of right lower lobe. Blood-pressure 142-108. Slight enlargement of cardiac area to the left. Deep reflexes lively. Urine negative. Spinal fluid negative. Wassermann reaction negative.

Mentally, patient was accessible, somewhat depressed, wondered if he would ever get strong, and worried about his family. He had a sixth-grade education; his grasp on school and general knowledge was meager. Said that he had never been strong, and complained a great deal of pains and aches. Thought that he was of a normal make-up; spoke of blue spells, and times when he did not care whether he lived or died, but never had the nerve to kill himself, and did not think about it. No hallucinations; no delusions. Thought processes were slow and limited to his own condition, and vague sad thoughts about his family. Felt that he needed rest and out-of-door treatment. Thought that he had weakened his nervous system by over-lifting. The intelligence rating was 11.8 years on the Point Scale, a regular examination.

The symptom complex here is that which is ordinarily ascribed to neurasthenia, namely, pains, weakness, easy fatigue, and fixation of ideas upon the physical condition. During the patient's ten days in the hospital he did not improve. Because of the low mental rating he was regarded as a primarily subnormal person, who had neurasthenia; without, however, any very definite history of severe nerve exhaustion previous to the onset of symptoms.

On December 20th, the patient was returned to the hospital by the police because of an attempt at suicide. Patient, however, denied this, but said that he might have made a bluff. Claimed that his head was better than when he was here two months before, but his nerves and stomach, and a burning feeling around his genitals and frequency of micturition bothered him.

It appears that he ran out on a third-story porch and threatened to jump off, and this was his bluff at suicide. At another time, when he was feeling very blue and depressed, he picked a knife off the table and drew it across his throat; his wife thought he meant it. He remained accessible, with fixation of ideas upon himself. He developed several times the idea of impending death, when he was very much agitated. Most of the time he was worried and depressed. On one occasion he made an attempt to escape because he wished to go home. His condition of agitation varied somewhat, but, as a rule, he was rather uneasy; was continually questioning the doctors about his condition, and about going home, insisting that he was

perfectly all right. Analysis of the gastric contents revealed nothing abnormal, although it cleared up the patient's idea that his stomach was out of order. He would beg for one more chance to prove that he was not insane, and could go to work and support his family. There were several periods when he thought he was going to die. Continued restless, depressed, and worried until transferred on January 29th, 1918. During this period he lost about twenty pounds in weight.

From the descriptions obtained, and from the examination of the patient, it appears that he had always been a subnormal person and of the psychoneurotic type throughout life; with a fixation of ideas upon physical ailments at about the age of thirty-eight; since which time, and because of this complex, he had been unable to work. A very important point is the high diastolic blood-pressure, ranging from 98 to 106. This, in general, means capillary fibrosis, and this in turn may give rise to pains in various locations. Because of his mental state, and the depression associated with it, he made attempts at suicide, or at least made threats of suicide as a means of obtaining sympathy. His temperament may be described as that of the cyclothymic, although his upper level was never one of great activity.

A case of this type really goes beyond the ordinary neurasthenic, chiefly because of the lack of a real appreciation of the situation. It is not typical of manic-depressive psychosis; he does show an anxious depression, although the depression is perhaps more subjective than objective. There were not at any time any self-accusatory ideas, nor any definitely formed somatic delusions. The ideas present are much vaguer than the ordinary somatic delusion, and definitely of the psychoneurotic type.

Because of the capillary fibrosis, of the original low level of the individual and the possible concomitance of involutinal factors, the prognosis is not particularly good.

This patient is obviously *insane*, in the legal sense, and so needs to be committed in order to prevent the possible success of his suicidal attempts. *So, although his psychosis is of the psychoneurotic type, he is insane and as such committable.*

In March, 1918, he is agitated, apprehensive, self-accusatory and restless. The case is regarded as one of manic-depressive at the institution to which he was transferred.

SUMMARY.

The first point of interest lies in the differentiation of psychoneurotic from psychotic states. In almost all of the cases presented the diagnosis is rather perturbing. Indeed, in some it appears rather clearly to be other than psychoneurosis. Yet in most cases the state seems to be what we call psychogenetic in origin, and there are many symptoms of a psychoneurotic nature.

It is very difficult to define simply and accurately the differences between psychoneurosis and psychosis. In both the symptoms may be of the same type—pains, somatic ideas, emotional and ideational difficulties. The great outstanding difference seems to be that the psychoneurotic resist the ideas, where the psychotic accept the ideas, incorporate them into the personality and elaborate them. There are also fatigability, sensitiveness and worrying as symptoms of the psychoneurotic state, which are not usual in the psychoses. It is readily seen that the border line is tenuous and decision often difficult. In such cases the reaction to suggestion and explanation may be very important in determining the true diagnosis. Such suggestion is often only temporarily accepted even by the psychoneurotic, so that this is not an infallible guide to correct diagnosis.

Most of these patients are obviously insane in the sense earlier given. Such patients as Case I (suicidal attempt); Case II (successful suicide); Case III (dementia præcox type of incorporation of ideas); Case IV (depression causing inability to care for self); Case VII (seclusion, suicidal attempts); Case IX (somatic delusions ?, psychosexual disturbance); Case X (attempts at suicide, agitation); are clearly in need of mental hospital care and treatment, for their own protection and in the attempt to alleviate the condition. Such cases are not suitable for out-patient treatment. Yet with the exception of Case III, Case VII and Case X, the symptoms are certainly those of a psychoneurosis.

Neurotic persons are especially likely to be thrown off balance under external stress and strain. This was true in Cases II, III (?), IV, V, VI (?), VIII, IX (?). In Case III the cause possibly lay in the distasteful work and the reaction to masturbation. In Case VI the external stress seemed to be related to a cause for depression, usually the death of a loved one—which brought up the vicious circle of ideas regarding her own death. In Case IX

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the cause is not quite so clear, and here, furthermore, the ideas are more incorporated into the personality. In the other cases the cause seems quite clear. In Cases I, VII and X the external cause is not so apparent. In fact, the exact cause does not always clearly appear. This, of course, is more like the origin of psychosis.

Thus, Case I seems possibly associated with alcohol (involution ?); Case VII with hypertension, and some organic brain lesion (type not clear); Case X with constitutional inferiority, hypertension and involution—all of which are factors which usually do not produce states of this sort, at least in our experience. Promptly the question is raised as to the relation between these *possible causes* and the observed state. But it does not seem that we have progressed far enough in etiological investigation, either psychic or organic, to do more than note the associations in these cases and to await the results of therapy. There is no *a priori* ground for believing that a *particular cause* is necessary, providing that the *soil* be right. We could phrase it thus: Any cause on particular soils, or particular causes on any soil—although this goes somewhat too far, it roughly approximates the truth.

Accordingly it appears that differential diagnosis of psychoneurosis versus psychosis is not always easy; that external and internal causes may produce much the same state; that some psychoneuroses (symptomatically) run a manic-depressive course; that psychoneurotic symptoms may occur as the prodromal signs of dementia præcox; that psychoneurotics not infrequently commit suicide; that many are insane; that such causes as alcohol and arteriosclerosis may operate to produce a syndrome not to be distinguished from psychoneurosis.

THE PATHOLOGY OF CHOICE REACTIONS.

BY FREDERIC LYMAN WELLS AND HERBERT A. STURGES.¹

(From the Psychological Laboratory of McLean Hospital.)

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I. CONCEPTION OF THE PROBLEM.

To the different situations presented to an organism, human or otherwise, differential reactions must be made if the organism is to survive. Sensory end-organs differentiate and interpret the situation as a stimulus; motor end-organs perform the differential response coordinated by the nervous system. The situation is "discriminated"; the reaction is "chosen." The choice reaction is a reaction adjusted to a discriminated stimulus. Proper choice reactions in life are implied in proper adaptation thereto.

The question underlying this study was, How are superior quickness and appropriateness in choice reaction processes which can be studied experimentally related to the choice reactions of life which have thus far eluded experimental control? Success, usefulness, happiness, are results of choice reactions called good, well-adapted, correct. Discontent, failure, mental disease, are expressions of bad, ill-adapted, false systems of psychomotor adjustment. This

¹ The portions of the work for which the authors are severally responsible are as follows: W. supervised the construction of the apparatus, installed same and performed the experiments. S. made practically all measurements and calculations. Tabular material was prepared jointly by S. and W. With suggestions from S. at various points, W. wrote the text substantially as the reader has it.

study is, in the first instance, a comparison of the choice reaction process in normal individuals and in mentally diseased ones. How do laboratory adaptations of those well adjusted to life compare with these reactions in persons thus badly adjusted to life?

In measuring how they compare, there is involved a fundamental source of error in the application of laboratory psychology to actual life. Adjustment in actual life is the expression of a proper balance of instinctive tendencies. The psychoses here considered are from the mental standpoint expressions of a failure of instinctive tendencies to balance (Adolf Meyer). Mental adjustment to actual life is governed by the instinct trends. It is just in their relation to the instincts that laboratory measurements differ most from the test of actual life. Formal complication without limit may be introduced in the laboratory; but the appropriateness of responses is usually a convention, and the instinctive appeal negligible. This investigation provides an answer to the question of how far this balance of instinctive life is reflected on the more superficial psychomotor level with which the present observations deal.

The pathology of choice reactions can be viewed from two angles. One is the direct comparison of normal and pathological individuals suggested above. From another angle, the false reactions of experiment become in themselves a part of the "psychopathology of every-day life." The data will be presented in both aspects.

The apparatus of the present experiments lays claim to no technical originality, and, if anything, errs on the side of simplicity. Chief stress was laid on the laboratory surroundings. With subjects accustomed to the unfinished aspect of most laboratory appurtenances, these do not greatly matter; but it was felt and is still believed that the effort spent in this direction was compensated in a more favorable attitude of the pathological subjects than had been met with in previous investigations. In the examining room was only such special apparatus as was needed for stimulus and reaction; pains were taken with the finishing of these and with other appurtenances to give the appearance of a well-appointed office.

The stimulus and reaction apparatus designed for these experiments consisted of two exposure screens and a 5-finger reaction key. These pieces are the originals of improved models later sup-

plied to the Carnegie Institute of Technology. The generally used exposure apparatus (here called "fall-screen") carries a frame some 28 inches high by 6 wide, which is moved by gravity against an oil-cylinder past a slit. The stimulus material is carried between guides on this frame, on a strip of heavy paper approximately 3 inches by $28\frac{1}{2}$ inches. The frame falls 1 inch for each exposure, affording 25 exposures per series on a strip. Electric contact is broken during each fall of the frame, and restored when it comes to rest for each exposure.

This apparatus is mechanically most satisfactory; but has the inherent disadvantage that the stimuli, following each other on a single strip, cannot be varied in order. To render this possible, another exposure screen (here called "light-box") was designed. This is a large box painted black inside, with an aperture in front through which the subject looks. Inside the box, in the rear, is a frame into which an ordinary playing card can be slipped from the outside. On such blank cards is lettered the stimulus material. Under ordinary conditions the material on this card is invisible to the subject (though the card itself is faintly to be made out); but closing the switch lights a concealed tungsten lamp which illuminates it to his vision, and also makes a momentary electric contact to register the stimulation. Single stimuli on each card could, of course, be presented in any order and without interruption to any amount. Otherwise it has been a somewhat less satisfactory instrument than the fall-screen. The fall-screen is the source of the results presented, the light-box figuring but incidentally in the present material.

For reactions with right and left hands, a telegraph key was mounted on each side of both the fall-screen and the light-box. For reactions using all fingers of one hand, a 5-finger key was especially made. Like the other pieces, it was finished in mahogany stain. It was placed on a table at the side of the fall-screen wherever desired. The only visible wiring in the room consisted of three 6-conductor and one 20-conductor Ulesote cables. These cables to the different pieces of apparatus were several feet in length, enabling the pieces to be shifted in the room according to convenience.

These cables are led through an aperture in the wall and immediately to a distributing board, through which any one may be readily connected with any terminal of the recording system. The

room containing this distributing board was used as a general shop and storage space, serving further to isolate the examining room from the distractions of the recording apparatus. This was installed in a large ventilated closet leading off of the second room.

Reactions were measured on a 6-pen ribbon recorder, spring driven, which had originally served as a burglar alarm register. The spring motor was stopped and started electrically, giving control from the examining room. The speed decreased considerably as the tension of the spring relaxed, a seconds time-line being employed. This was taken from a Porter electric clock. This circuit was also connected through a relay with a lamp in the examining room, which, not visible to the subject, gave the examiner a rhythm used in the experiments. Pen No. 6 on the recorder, operated by this circuit, also registered the stimuli on the fall-screen. The remaining five pens registered reactions of the five fingers, pens 1 and 2 those of right and left hands, also the stimuli of the light-box experiments.

Series 20.	Series 10.	Series 50.
1.....13245	13245	eoüia
2.....45321	45321	iaueo
3.....21354	21354	ueoai
4.....45123	45123	uioae
5.....14523	14523	eoaii
6.....52431	52431	eiüoa
7.....21345	21345	ouiaç
8.....13425	13425	ioeua
9.....42153	42153	uaœei
10.....42315	42315	euaoi
11.....15432	15432	cioau
12.....52341	52341	iaueo
13.....15423	15423	oaciu
14.....51324	51324	uieao
15.....34215	34215	uioea
16.....24153	24153	iüoae
17.....12354	12354	uaieo
18.....15234	15234	oiauo
19.....43521	43521	aoeui
20.....21453	21435	ieüao
21.....54231	54231	aoeui
22.....42315	42315	iaœou
23.....13542	13542	uaœie
24.....34152	34152	ieüoa
25.....43152	43152	oieau

With this apparatus, there were made choice reaction experiments of five different kinds. No specific names were assigned to these, but they are known by the numbers 20, 10, 50, 110, 100, cited in the order in which they were uniformly presented to the subject. Each of these experimental series represents 25 stimuli for choice reactions of its particular type. The copy contained in the experimental series 20, 10 and 50 is reproduced on preceding page.³

The strip containing the experimental material was properly adjusted in the frame, and the stimuli successively exposed by tripping a hand-operated release. From 2-3 seconds after the subject had reacted to one stimulus, the next was given. This interval was controlled from the rhythmically winking lamp. The time intervening between the experimental series was that required to remove the strip and insert the next one, which is about 70-90 seconds. Between series 50 and 110 there was regularly a longer intermission, as at this point a new roll of paper had to be inserted in the recorder and the mechanism rewound.

The instructions to the subject for the individual series were presented to him in written form, and to reproduce these is probably also the best way of describing them to the reader. Oral explanations were given to questions if the subject asked any, and the character of these noted. The written instructions of the different series are as follows:

Series 20.—In the opening before you, where you see the white paper now, there will appear, one by one, sets of five figures, one of which is underscored,³ like this: 54312, or 13542, or 25413. As soon as the set of figures is seen, strike⁴ the telegraph key corresponding to the figure that

³For the material in series 100 and 110, cf. sections 10 and 14. The numerals set in black-faced type are in the copy underscored. Black-faced type was here used because of difficulties incurred in setting the separate figures with a line under them.

³The figures underscored in the tests here and subsequently referred to as underscored are set in black-faced type as explained in foregoing footnote.

⁴This movement momentarily closes the circuit through the recording pen. Previous reaction experiments with pathological subjects indicated the advisability of a reaction movement of this kind. The recording of the process by breaks instead of makes, while capable of greater accuracy, would have complicated the apparatus out of proportion to the degree of precision required.

is underscored. When the figure 1 is underscored, strike the first key with the thumb; when 2 is underscored, strike the second key with the forefinger; when 3 is underscored, strike the third key with the middle finger; when 4 is underscored, strike the fourth key with the fourth finger; when 5 is underscored, strike the last key with the little finger. Each new set will appear about 3 seconds after you have struck the key for the last one. Thus the first set above, 54312, would mean striking the third key (with the middle finger).

Do this as quickly as you can do it correctly. Strike each key with a quick, sharp motion so as to make sure of a good contact, but letting it up again as soon as a good contact has been made. (As a typewriter would be struck.)

Series 10.—In the opening before you, where you see the white paper now, there will appear, one by one, sets of five figures, like this: 24315, or 52413, or 35421. As soon as the set of figures is seen, strike the telegraph keys corresponding to the figures presented in the order in which they come in the set. For the figure 1, strike the first key with the thumb; for 2, strike the second key with the forefinger; for 3, strike the third key with the middle finger; for 4, strike the fourth key with the fourth finger; for 5, strike the last key with the little finger. Thus the first set of figures above, 24315, would mean striking the second key, then the fourth, then the third, then the first and then the fifth, with the corresponding fingers. Each new set will appear about 3 seconds after you have struck the keys for the last one.

Do this as quickly as you can do it correctly, etc.

Series 50.—In the opening before you, where you see the white paper now, there will appear, one by one, sets of the five vowel letters, aeiou, like this: ouiea, or euoia, or aouie. Strike the telegraph keys for them exactly as for the sets of five plain figures, a representing 1, e 2, i 3, o 4, u 5. Thus for a, strike the first key with the thumb, for e strike the second key with the forefinger, for i strike the third key with the middle finger, for o strike the fourth key with the fourth finger, and for u strike the last key with the little finger. For example, the first set of letters above, ouiea, would mean striking the fourth key, then the fifth, then the third, then the second, and then the first, with the corresponding fingers. Each new set will appear about 3 seconds after you have struck the keys for the last one.

Do this as quickly as you can do it correctly, etc.

Series 110.—In the opening before you, where you see the white paper now, there will appear, one by one, little sums, like this: $4 + 5 = 9$, or $6 + 8 = 14$. Sometimes these sums are correct, as above, but sometimes they are incorrect, as $4 + 3 = 8$, or $6 + 9 = 13$. As soon as you see the little sum, notice if it is right or wrong, and if it is right, strike with the right hand the telegraph key on that side of the stand; but if it is wrong, strike with the left hand the key on the other side. Thus in the examples given above, $4 + 5 = 9$ would mean striking the right hand key, and $6 + 9 = 13$ would mean striking the left hand key. Each new sum will appear about 3 seconds after you have struck the key for the last one.

Do this as quickly as you can do it correctly, etc.

Series 100.—In the opening before you, where you see the white paper now, there will appear, one by one, short sentences, like this: "horses have four feet," or "people live in houses." Sometimes what the sentence says is correct, as above, but sometimes it is incorrect, as, "eight inches make a foot," or "violets have thorns." As soon as you see the sentence, notice if it is right or wrong, and if it is right strike with the right hand the telegraph key on that side of the stand; but if it is wrong, strike with the left hand the key on the other side. Thus in the examples given above, "horses have four feet" would mean striking the right hand key, and "eight inches make a foot" would mean striking the left hand key. Each new sentence would appear about 3 seconds after you have struck the key for the last one.

Do this as quickly as you can do it correctly, etc.

The experimental procedure was refined as experience with the method was gained. It was endeavored to keep rather detailed notes of the subject's attitude and behavior, which was facilitated by a working knowledge of shorthand, and out of this there developed a more systematic method of noting the behavior differences observed in the subjects.

The physical features of the method were adapted for introspective reports, since series could be indefinitely interrupted at any point, and ample facilities for note-taking were at hand. At least one psychologist trained in introspection, who took part in the experiments, drew attention to the possibilities of the method in this direction. The actually negligible place of introspection in the study is conditioned by several factors, regarding which some comments may be made. The school in which the experimenter was reared tends, recognizedly, to consider an increased number of observations more important than elaborate introspective records. This writer has taken part in one experimental investigation where introspection was a prime factor, the relation of the psychogalvanic reflex to emotional reactions. Conditions in that study were more generally favorable to introspection, approaching, indeed, those of psychoanalysis. The impression was gained from this work that earlier introspections were relatively untrustworthy, to become more reliable with practise. With practise, resistances are broken down. Some of the normal persons considered here are fairly well practised in at least the laboratory type of introspection; but the pathological subjects have scarcely any such practise, to which must in some cases be added disinclination to the mental effort of introspection, and the direct influence of the psychosis in distorting it. The most fundamental consideration, however,

is that ordinary introspection, whoever performs it, reaches only that part of the mental process of which the person is aware. If anything stands out in the progress of psychological thought during the past ten years, it is recognizing the inadequacy of this part of mental process in the motivation of behavior. Given a false reaction with its attendant introspection of failed attention in terms of imaged or imageless thought, this is a rationalization which describes the false paths the mind followed rather than the force which impelled it along those paths. One gets no further with introspection under the attendant laboratory conditions, having at present no way to combine such complicated experimental routine with an exploration of the unconscious.

Interpretation of results is naturally governed by the character of the subjects from whom they are derived. The 14 individuals here included in the normal group are persons from 20-50 years old, who have up to the present adjusted themselves variously well at various levels, but all well enough for an existence of normally continuous independence. Three had special training in experimental psychology, and are men of recognized standing in it. Four others are as well known in the field of psychiatry. The remainder are at least in mental balance equal to these seven, and it is of course this characteristic that we are concerned with, rather than special abilities that make for distinction.

The 11 pathological subjects are all men, one being, however, a head-injury case. Of the others, six are of manic-depressive and four of dementia præcox type, all upon more or less psychopathic basis. It is doubtful if more than one of them had so much as ever reached an average adjustment to life. Detailed histories, while accessible, are dispensed with as not sufficiently relevant to the present study.

The normal subjects are designated by the letters B, C, E, H, J, K, L, M, R, S, T, W, X, Y. The pathological subjects are designated by the numbers 16, 17, 24, 31, 36, 71, 74, 75, 79, 84, 86.

There follows a bird's-eye view of the material to be presented, enumerating the several sections under which it is brought forward.

II. Correct reactions of normal subjects :

1. Series 20. Individual differences in reaction speed.
2. Series 20. Comparative work-curves.

3. Series 10. Individual differences in reaction speed (designated by the symbol r).
4. Series 10. Individual differences in speed of the total process (designated by the symbol t).
5. Series 10. Properties of time elapsing between the first reaction and the last reaction of a pattern (*i. e.*, $t-r$, designated by the symbol s).
6. Series 50. Individual differences in reaction speed.
7. Series 50. Individual differences in speed of the total process.
8. Series 50. Properties of the time elapsing between the first reaction and the last reaction of a pattern.
9. Series 110. Individual differences in general speed of reaction.
10. Series 110. Comparative speed of reaction to correct and incorrect propositions.
11. Series 110. Effect of degree of incorrectness on reaction speed.
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III. Correct reactions of pathological subjects compared with those of normal subjects:

15. Series 20. Comparison of normal and pathological groups in reaction speed.
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21. Series 50. Comparison of normal and pathological groups in t speed.
22. Series 50. Comparison of normal and pathological groups in respect to the time s .
23. Series 110. Comparison of normal and pathological groups in reaction speed.
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II. CORRECT REACTIONS OF NORMAL SUBJECTS.

The above sections will now be taken up in order. The first 14 deal with the correct reactions of normal subjects. Reaction time measurements are given to the nearest hundredth of a second only.

1. *Series 20, Reaction Speed.*—In this series a pattern of five figures is shown, one of which is underscored. The subject strikes on a 5-finger key, the key corresponding to the figure underscored. Probably the speed with which this can be done varies with the finger employed, as well as with the position of the underscored figure in the pattern. These are not studied in the present report; the succession of stimuli was of course the same for all subjects.

Data on series 20 are present from 10 of the normal subjects. For the first experiment, the grand average reaction time is .84 second, with a range in central tendency from .57 in subject E to 1.10 in subject H, who are both among the psychiatrists. The three experimentalists did not show quicker times than the remainder. The normal choice time in this process is thus found to range from about .5 to 1 second.

2. *Series 20, Work-Curve.*—As the series of 25 reactions proceeds, practice makes itself evident. Averaged in groups of five reactions, the successive reaction times of the 10 subjects involved are .92, .85, .93, .74, .75. The tendency is not regular, and the lengthening of time in reactions 11-15 is a consistent feature of the

group, perhaps accounted for by the fact that reactions 11-15 chance to involve only the last three fingers. The mean variation of these subjects in reaction 1-5 is .17; in reactions 20-25 it is .11. The learning has reduced the individual differences, as need not surprise us in processes of this psychomotor level. In the writer, observations were made on three different days, without the appearance of day-to-day practise.

3. *Series 10, Initial Reaction Time.*—In this series a pattern of five figures is shown, and the subject must strike, in order, the keys corresponding. Two measurements are involved: First, the time for starting the response (designated by r), and second, the time required for the total five reactions (designated by t). Thirteen subjects give a grand average, r -time of .87, insignificantly longer than that of series 20. The mental adjustment differs from that in series 20 in that: (1) There is no need to examine the whole pattern for an underscored figure, and (2) the process is not ended, as in series 20, by striking a single key; all the others must also be struck in right succession. The latter factor, which would lengthen the initial reaction, at least counterbalances the former, which would shorten it. There is some gathering up in the mind of the whole pattern before starting the reaction at all. There is an "overlapping" in the mental processes of the initial and the subsequent reactions. The amount of this varies among the subjects. Two subjects take markedly less time to start the process in series 10 than for the single reaction of series 20. Three take much longer to start in series 10 than for the single reaction of series 20. Two of these, however, are quicker than the average to complete series 10, showing part of this initial time well spent in fixing the pattern for the total process. The general tendency to practise improvement is less marked in these r times than in the single reactions of series 20, but it is more regular.

4. *Series 10, Speed of Total Process (t).*—For striking the five keys in order, the grand average time of the normal subjects is 2.95 seconds. Some overlapping of the five movements is indicated, as this is but 3.4 times the interval required for single reactions of this nature. Individual difference ranges from 1.76 to 4.81, each made by a superior personality, the shorter by a man of experimental training. A professional stenographer in the group

was fourth from the fastest; the special motor training of this subject not making itself particularly effective. (The probability of interference from the figures of the typewriter keyboard is slight).

Series 20, which immediately preceded the present series in experimental routine, sets up the association between the exposed figures and certain finger movements, which series 10 develops more intensively. The association seems to be a fairly natural one for the normal subjects, as this series adds no great amount of learning to that of series 20. The average times for the successive groups of five exposures are 3.18, 3.04, 2.83, 2.82, 2.90. Mean variation for reactions 1-5 is .73, for reactions 20-25, .71. But in several subjects no learning is seen at all, nor is it the slowest operators who show the most learning. Observations on four different days with subject J and two with subject K did not show learning carried over from day to day.

5. When learning in this type of series takes place, it is of interest to know how different portions of the process are affected; how it alters the time of different parts of the total process. The main point of comparison is between the initial reaction time r , and the time for the *remainder* of the process; *i. e.*, total time minus initial time, designated by s . Fusion is shown in a decrease of the time s , more marked than decrease in the time r . In general, this fusion is questionable for series 10. The time s for the successive 5-exposure groups is 2.25, 2.15, 1.98, 1.96, 2.07; with m. v.'s increasing towards the end of the series, .57, .65, .61, .64, .69. The per cent of t time included in r time, is, for these successive 5-exposure groups, 29.3, 29.3, 30.1, 30.5, 28.6. If an equal time were spent on each unit of the pattern, this figure would be 20 per cent. The first reaction takes disproportionately long, but this proportion changes little as the series progresses. Individually, subject C shows much learning, but it affects the initial time as much as the total process. K, on the other hand, decreases the t time from 3.79 to 2.70, while r remains about 1.60. L shows marked decrease in s , 2.04 to 1.58, while the r time is nearly constant at 1.05. These two cases alone show notable fusion.

6. *Series 50, Individual Differences in "r" Speed.*—Series 50 is the same as series 10, except for using a more difficult type of

association. Instead of the natural association between the five fingers and the digits 1-5 it calls for association between the five fingers and the alphabetical order of the five vowels, a e i o u. The results differ correspondingly from series 10. The process takes longer and there is more learning. The general average r time is 1.41, the decrease through the 5-exposure groups being 1.61, 1.51, 1.41, 1.31, 1.23; m. v.'s about .30 throughout. The range in central tendency is from .97 in subject T to 2.02 in subject H, physicians of about equal standing. Substantial learning for the r time in the first experimental session is shown in all subjects except K, L and R, two experimentalists and a medical man who has done experimental work. The stenographer is somewhat slower than the average in reactions 1-5, and improves to as much faster than average in reactions 20-25. Repeated experiments in subjects E, J and K show considerable learning carried from day to day in the first two subjects.

7. *Series 50, Individual Difference in "t" Time.*—This is the longest of any process in the present study. Its general average, for 13 subjects, is 4.53 seconds. Its course through the 5-reaction groups is 5.76, 4.79, 4.29, 4.08, 3.72; with m. v. of 1.13 and .68 at beginning and end respectively. Its range in central tendency is from 3.78 to 7.20, both results from persons of the upper levels of distinction. The former is a trained experimentalist, and his record is nearly equaled by the stenographer. For a touch typist, as is this subject, different fingering from the typewriter keyboard is used for the reaction to a, e and u, but the same for i and o. She, with the college student, also a woman, show the most improvement through the series. All records are marked by fairly regular learning in this series.

8. *Fusion: Properties of the Time s.*—In series 10 there was little progressive fusion of the reaction processes as the series proceeded. In series 50, on the other hand, the initial reaction takes not only a larger proportion of the time than in series 10, but this proportion becomes larger as the series progresses. The general averages for the time s in the successive 5-exposure groups are 4.15, 3.27, 2.88, 2.77, 2.49, showing marked decrease in the length of the t time as compared with the r time. M. V. of these quantities is respectively 1.01, .79, .58, .72, .36. Thus a more equal relation between r and t is also indicated as the series progresses. Intro-

spection might disclose many different types of dealing with the mental task at the outset, of which practise eliminated the less efficient ones. Again significant is the percentage which the initial reaction is of the total process time. These percentages for the successive 5-exposure groups are 27.9, 31.5, 32.8, 32.3, 33.1. Progressively more of the entire adjustment becomes incorporated in the initial reaction. More than with the easier series 10 it is necessary to fix this unaccustomed pattern in the mind before an effective beginning can be made. The progressively greater tendency to this preliminary fixation of the pattern goes hand in hand with increased effectiveness in carrying it out.

9. *Series 110, Individual Difference in Reaction Speed.*—Simple mathematical sums are exposed; reaction is with the right hand if the sum is correct, with the left hand if it is incorrect. The general average time of these reactions in the 14 subjects is 1.17 seconds. The range is from .79 to 1.73 in a chief attendant and experimentalist respectively. The 5-exposure groups average 1.37, 1.17, 1.01, 1.28, 1.03; practise beyond a short initial stage being questionable.

10. *Series 110, Reactions to the Different Items.*—The separate sums exposed in this series, with the average reaction time to them, and the ratio of the m. v. to this time, are as follows:

Sum.	Average reaction time.	M. V. average.	Sum.	Average reaction time.	M. V. average.
1....5 + 6 = 12	1.64	.18	14....5 + 9 = 15	1.31	.16
2....5 + 1 = 6	1.18	.26	15....6 + 2 = 9	.99	.15
3....2 + 7 = 9	1.28	.38	16....3 + 2 = 5	.96	.23
4....5 + 2 = 8	1.25	.26	17....7 + 8 = 16	1.79	.42
5....8 + 9 = 19	1.55	.14	18....2 + 6 = 8	.97	.21
6....6 + 7 = 15	1.46	.16	19....5 + 8 = 13	1.70	.45
7....8 + 1 = 11	1.08	.12	20....4 + 2 = 8	1.11	.23
8....7 + 6 = 13	1.21	.23	21....4 + 5 = 9	.97	.20
9....8 + 1 = 10	1.07	.15	22....6 + 4 = 10	.79	.18
10....2 + 4 = 6	1.03	.15	23....2 + 7 = 11	.90	.16
11....3 + 7 = 10	.96	.11	24....9 + 8 = 17	1.53	.36
12....1 + 5 = 6	.87	.28	25....5 + 4 = 11	.98	.32
13....6 + 3 = 9	.94	.24			

In this series, 13 of the sums are correct and 12 are incorrect. The average reaction time to the correct sums is 1.11 seconds and that to the incorrect sums is 1.26 seconds.

11. *Time in Series 110 as Affected by Degree of Incorrectness.*—It has been established in the sensory field that the magnitude of difference bears a close relation to the ease of discrimination. In

the present series, six of the sums are incorrect by 1, and six others are incorrect by 2. The general average reaction time for the sums incorrect by 1 is 1.34 seconds; for those incorrect by 2 it is 1.18 seconds. If the difference were further increased, the difference between the reaction time to correct and incorrect sums might easily disappear or become negative.

Item.	Average reaction time.	M. V. average.
1. Snails can run fast.....	1.83	.17
2. Flies like sugar.....	1.36	.23
3. Snow comes in winter.....	1.13	.17
4. Eagles cannot fly.....	1.39	.28
5. Sugar is sweet.....	.95	.28
6. Iron melts in the sunshine.....	1.54	.16
7. Water is good to drink.....	1.08	.24
8. Mosquitoes are pleasant.....	1.20	.19
9. Wood floats on water.....	1.23	.15
10. Mice like cheese.....	1.21	.20
11. Crabs have claws.....	1.46	.19
12. The sun sets in the east.....	1.64	.33
13. Water runs down hill.....	1.22	.17
14. Cats have no claws.....	1.66	.41
15. Iron sinks in water.....	1.41	.24
16. Stealing is right.....	1.30	.17
17. Stones are good food.....	1.38	.12
18. Lemons are sour.....	1.35	.37
19. Spiders catch flies.....	1.81	.41
20. Roses have no smell.....	1.79	.46
21. Horses eat lions.....	1.42	.22
22. Potatoes are poisonous.....	1.42	.23
23. Bees gather honey.....	1.01	.13
24. Dogs eat meat.....	1.06	.18
25. Horses can talk.....	.97	.18

12. *Series 100, Individual Differences in Reaction Speed.*—In this series are presented simple verbal statements, correct or incorrect. Reaction is with the right hand if correct, with the left hand if incorrect. Reaction times to these are distinctly longer than for the sums, and progressive adaptation to the experiment is not indicated in shortening the reaction times. These are, for the successive 5-exposure groups, 1.52, 1.25, 1.46, 1.55, 1.19. The general average is 1.35. The range is from .98 to 2.01 in an experimentalist and attendant respectively. Repetition of the series in subjects J and K indicates considerable persistence of practise between the days.

13. *Series 100, Comparative Reaction Time to Correct and Incorrect Propositions.*—Thirteen of the statements in this series are correct and 12 are incorrect. The discrimination time of the correct statements is 1.25 seconds; for the incorrect statements it is 1.46 seconds. As it does not appear that the left hand is specifically slower in choice time than the right, these results and to some extent those of series 110 would seem to point to a generally greater difficulty of reaction to the incorrect propositions. Introspectively, the mental adjustment to the incorrect propositions appears harder to the present experimenter.

14. The table on preceding page gives the several items in the series, with the average reaction time of 11-12 subjects in each, and the *ratio* of the m. v. to this average.

The data do not lend themselves to generalization. It is singular that the longest average, save the initial one, should be so simple and commonplace a statement as *spiders catch flies*, which shows great variability also. It is likely that the length of the reaction is so much governed by the form and length of the statement as to vitiate comparisons between the separate items as such. Negatives like *cats have no claws*, or *roses have no smell* appear in themselves troublesome, though *eagles cannot fly* has a much shorter time. The ratio of m. v. to average varies considerably and is hardly consonant with differences of opinion on the topics. There is least variation about the edibility of stones, most about the smell of roses, and more than the mean about whether lemons are sour. What comes nearest a debatable proposition (*potatoes are poisonous*) shows relatively small variation in the judgment times. The significance of the experiment would have been clearer had it been constructed wholly of 3-word statements, such as *flies like sugar*, *stealing is right*, *lemons are sour*, *horses eat lions*. Its present data can be used for little beyond the comparison of normal with pathological performance that is the central theme of the study.

The chief of the above results which can be presented in tabular form are summarized below, for convenience of keeping them in mind to compare with the data on pathological subjects that are next to be taken up:

	Series: 20	10 r	10 t	50 r	50 t	110	100
General average.....	.84	.87	2.95	1.41	4.53	1.17	1.35
Fastest record.....	.57	.53	1.76	.97	3.78	.79	.98
Slowest record.....	1.10	1.37	4.81	2.02	7.20	1.73	2.01

III. CORRECT REACTIONS OF PATHOLOGICAL SUBJECTS COMPARED WITH THOSE OF NORMAL SUBJECTS.

The 11 paragraphs following present a comparison of the correct reactions in the normal and pathological subjects. The method will be to compare the performances of the single pathological cases with the normal ranges and central tendencies. It will appear whether the pathological cases fall within this normal range or on what side of it.

The normal subjects represent a fair variety of education, achievement and balance, and their performance must for present purposes be considered representative of normal limits. There is no significant difference in the social groups from which they came, and those from which the pathological subjects are derived. The latter are somewhat younger, and as a group have less education, but this is in a large part the direct outcome of the psychopathic traits. It is in mental balance that the essential difference is found. The normal group contains seven physicians, three workers in experimental psychology, two attendants, a college student and a stenographer. The pathological group contains a teacher, a physician, a salesman, a stenographer, three other men of business, and four subjects who through both youth and mental constitution have never obtained training for independent work.

15. *Series 20, Reaction Speed.*—A general slowing of the process in the pathological cases is apparent, though but two fall outside the range of the normal subjects. These are a young circular case a little depressed at the time, and a young paranoid schizophrenic. But one of the pathological group is as fast as the above normal average. Practise phenomena in some cases give good evidence of ability to attain the more rapid speeds shown by the normal subjects.

16. *Series 20, Work-Curve.*—While the reaction time in this series is thus consistently longer in the pathological cases, no pervasive change in the work-curve is noted. Regular tendency to practise improvement is shown, save in case 31, the schizophrenic above-mentioned. In him the successive 5-exposure groups show definite lengthening, as follows: 1.56, 1.59, 1.57, 1.71, 1.84 seconds. His two fellows in diagnosis do not show this anomaly. Observations repeated in the pathological subjects show shortening of the

times, even when the interval is several weeks; but this result is governed also by changes in the patients' condition, and is left for discussion from that angle.

17. *Series 10, Comparison in r Speed.*—Both normal and pathological subjects show a greater range in this function than in series 20, but this increased range is much more marked with the pathological cases. Six are slower than the slowest normal, one being the head injury case; of the others, three are circular and two schizophrenic cases. Three make this reaction faster than the normal average: respectively, a slight depression who is practised at the organ, a young circular depression, and an obscure case of probably schizophrenic origin. It thus appears that the r time in series 10 is relatively shorter than the single reaction of series 20, while in the normal subjects it was very slightly longer. This may be an expression of slower adaptation to the whole experiment in the pathological cases. All through this series these subjects are still making adjustments to the general situation, which the normal subjects have completed before series 10 is actually begun.

18. *Series 10, Comparison in t Speed.*—The variation of the pathological subjects from the normal is less accentuated than with the r time, only three being slower than the slowest normal. The young circular case, 79, is now alone faster than the normal average. In general, the times in series 10 are thus slower than the normal, and the difference is rather more pronounced than in series 20. The amount of learning within the series is less than for the normal subjects.

19. *Series 10, Comparison of the Time s .*—The time s is the time t minus the time r ; i. e., the time elapsing between the initial reaction and the final reaction of the 5-figure pattern. The greater this quantity s in proportion to r , the longer is the total reaction t in proportion to r . The smaller the ratio of s to r , the more fusion has taken place between the initial and the total process; the more the settings for the various portions of the reaction pattern have fused into a single setting during the initial period r . For the normal subjects, s is about 2.5 times r ; and, as was noted in section 5, this relation changes little as the series progresses. Among the pathological subjects, with their generally less efficient carrying out of the series, one might expect the capacity to fuse the reac-

tions of this pattern, to represent relatively superior psychomotor adjustments, but this does not appear. Of 10 pathological subjects, five show less fusion than the normal average, and five show more, two of these strikingly more. These two are the head injury and the schizophrenic case 31: two subjects as far apart in their essential mental constitution as two patients could well be.

20. *Comparison in Series 50, r Speed.*—In this more difficult analogue of series 10, the pathological subjects vary less than in 10 *r*. Four are slower than the slowest normal, as compared with five in 10 *r*. (Case 31 did not undergo this experiment.) They are the schizophrenic case 75, and the circular cases 74 and 71, and the head injury case 86. Only one is as fast as the normal average, as compared with three in 10 *r*; this is the manic case 16, who approaches the normal limit in speed. Some cases show marked learning, others none at all.

21. *Comparison in Series 50, t Speed.* All the pathological subjects but the manic physician 16 are slower than the normal average. Cases 71 and 75 have improved from their positions in 50 *r* to within normal limits; the circular depression 74 and the head injury 86 remain outside them. The mean *t* time of the pathological subjects is about 6.40, and only the three cases above-named show marked variation from this. While the subjects differ greatly in the amount of learning they show, this does not seem related to differences in the psychoses.

22. *Comparison in Series 50, Time s.*—From this measure, as pointed out in sections 5, 8 and 19, is derived the amount of fusion that takes place between the initial reaction time and the total process time; the extent to which the pattern is fixed before starting the reaction. Some fusion was found in series 10, but it was not progressive; neither did significant difference appear in the normal and pathological groups. In series 50, distinct progressive fusion is found in the normal subjects (section 8). The general tendency of the pathological subjects is to show less fusion than the normal, in conformity with their greater slowness. The five movements of the patterns are more discrete processes with them than with the normal subjects. Two cases, indeed, show a tendency to increase the time of the total process in proportion to the initial reaction time. These are the excited cases 16 and 36.

23. *Series 110, Comparison in Reaction Speed.*—Only two of the pathological subjects are faster than the normal average in this series. They are again the manic case 16, and the mild depression 24, whose occupation may have given him special facility with these simple arithmetical associations. The two subjects who are slower than the slowest normal are both young circular cases, with a strong psychopathic basis. The cases show here what is not usually seen, a greater tendency to practise improvement than do the normal subjects. Three schizophrenic subjects, 84, 75 and 31, and two circular cases, 74 and 36, show especially great improvement. The relative inefficiency of the pathological adjustment is greatest at the beginning of the series and is afterwards less conspicuous.

24. *Comparison in Series 110, Correct and Incorrect Propositions.*—Among the normal subjects, the average reaction time of the correct sums was 1.11 and that of the incorrect, 1.26 seconds. This difference is greater in the pathological subjects. Their average time for the correct sums is 1.27, and for the incorrect, 1.80 seconds. This suggests, for the pathological cases, a much more positive effect of the falsity in lengthening these reaction times than is present with the normal subjects.

25. *Series 100, Comparison in Reaction Speed.*—In this function, the separation of the pathological from the normal subjects is greater than in any other considered. Not one is as fast as the normal average. Over half are slower than the slowest normal. Of course, these cases are in a phase of inferior adjustment to the facts of life, and it is a rationally facile step from this to their inferior adjustments in recognizing the statements of natural fact. These are in general more difficult than the mathematical statements of series 110, and this difficulty is relatively accentuated for the pathological subjects. The result is suggestive of relationship with disturbance of the *fonction du réel* in these cases. This would be supported by the fact that the two most deluded cases of the group, 31 and 75, also show the slowest discrimination of these statements. But this relation is not elementary, for no such delusional extremes appear in other subjects slower than the slowest normal, nor are the more rapid cases relatively free from delusions. It may be noted that the two especially deluded cases, 31 and 75, were rapid in series 110 in comparison with their performance in

series 100. This forms one of the promising leads for further prosecution of the general research, with an experiment improved in construction, as indicated in paragraph 14.

26. *Comparison in Series 100, Correct and Incorrect Propositions.*—For the normal subjects, the average reaction time to the correct statements was 1.25, and for the incorrect, 1.46 seconds. As with series 110, this difference in favor of the correct statements is greater with the pathological subjects. Their average reaction time for the correct statements is 1.86, for incorrect statements, 2.57 seconds. The falsity of statements in both series 110 and series 100 makes more difficulty for the pathological group than it does for the normal. The capacity to distinguish correctness and incorrectness in natural fact as quickly as in mathematical fact, and the general ability to distinguish incorrect statements as quickly as correct ones, are features belonging distinctly to the normal as apart from the pathological group.

IV. FALSE REACTIONS OF NORMAL SUBJECTS.

Efficient adjustment to the environment consists in doing the right thing at the right time. By the convention of these experiments, the right thing to do is to tap certain keys; and the right time to do it is as soon as possible after perceiving a given stimulus. We have, therefore, two measures of efficiency in these experimental adaptations. One is whether the right keys are struck, the other is how quickly they are struck. We have been considering only the cases in which the right keys were struck, and the sole factor has been the time element in the adjustments. Reactions in which wrong keys are struck have not figured in the results hitherto presented, and are now to be taken up.

A reaction that is incorrect according to the experimental conventions is called a "false reaction." The tendency to false reactions is in theory more relevant to this investigation than is the time of correct reactions. We found, indeed, that the pathological subjects as a group did the right thing in these experiments more slowly than the normal. But it is elementary that the maladjustments that make these subjects psychopathic are not in doing the right thing too slowly, but in doing the wrong thing altogether. In mental disease the simple slowing of mental processes—"thinking difficulty"—is a definite symptom enough, but

one of restricted significance. The essence of mental maladjustment lies in false reaction at deeper levels than are accessible to experiment. Does this also show itself in a greater tendency to false reactions on the more superficial levels which these experiments reach?

27. A false reaction may result from disturbance in any part of the psychomotor arc. We distinguish two levels of these disturbances. In this section will be discussed that in which the real nature of the stimulus does not come to consciousness (misperception of stimulus). Section 28 takes up the cases where it does come to consciousness, but the reaction is false nevertheless.

If the stimulus is misperceived, the end result is false, though the association and motor mechanisms function perfectly. Such misperceptions of stimulus occur in the method of right and wrong cases, where the difference between the compared stimuli is minimal and not always to be correctly perceived. Important observations of this type of false reaction have been made with normal subjects by Henmon.^{*} He used discrimination of line lengths with a difference calculated to give in general 84 per cent of right perceptions. The subject reacted with the key on the side at which the longer or shorter line appeared, according to convention. The time of the reactions to wrong judgments in observations with three subjects was compared with the time of reaction to right judgments, and the general average for wrong judgments was among them somewhat longer than that for right judgments. The time of wrong judgments was found to vary in a way that indicated two types of wrong judgments: "those that are rendered too quickly, and those that are prolonged beyond the optimal time." Among those rendered too quickly may be premature reactions, which are not actual reactions to the stimulus, but have an even chance of appearing right or wrong. When a false reaction takes longer than the "optimal" limit, the delay is presumably a result rather than a cause of the falsity. The misperception of the stimulus in the first place prolongs the time of its getting into action.

But the governing factor seems to be the definiteness of the right perception or misperception. This is indicated by the intro-

^{*}The Relation of the Time of a Judgment to Its Accuracy. *Psychol. Rev.*, 1911, XVIII, 186-201.

spective "degree of confidence" of the judgment. Whether right or wrong, judgments with a high degree of confidence are in this group of subjects shorter than those with a low degree of confidence. Indeed, the longer average of the wrong judgments appears determined by the fact that these are relatively numerous in the low degrees of confidence, while the right judgments are relatively less frequent there. It would not then seem to be a result of this study that wrong judgments, as such, take longer than right ones to make, and this is confirmed by Henmon's tables on individual differences. Their longer average comes about in this way: The nearer the certainty of the discrimination approaches zero, the longer will the reaction naturally become, and the closer does likelihood of its being false approach its chance limit of 50 per cent. Given the same degree of confidence, there is no evidence that wrong judgments take longer than right ones. Their longer average is due to the heaping up of wrong judgments in the category which is long for another reason—its uncertainty.

While it is thus evident that misperception of stimulus is with small differences an important cause of false reaction, it comes less into question for the present experiments. The stimulus material is plainly legible, and its constitution such that errors from this source would hardly pass unnoticed. There was no evidence of them, and they are probably represented only by negligible accidents.

28. The type of false reaction we meet in the present experiments is that encountered in a previous and more extensive study by Henmon,* where the differences are, as in the present case, calculated to obviate misperceptions. Here the numerous false reactions represent maladjustments forward of the perceptive process. It was the present experimenter's privilege to closely follow this study, which indeed gave initial impulse to the investigation now reported. The detail of the false reactions presented in this section was kindly furnished later by Professor Henmon.

Henmon's study is intensive in character, involving large numbers of observations with a small number of subjects. Differences were studied in the perception of color, line length, and pitch. Such data throw light on the general tendency to false reaction,

*The Time of Perception as a Measure of Differences in Sensations. *Arch. of Phil., Psych. and Sci. Methods*, 1906, No. 8.)

how it is affected by the magnitude of the differences, and their relation to the time of the false reaction.

Besides the misperceptions of stimulus above-mentioned, there is a systematic and a random way in which false reactions can occur, which may be described in particular reference to these studies as follows:

(a) In Henmon's experiments, the subject sometimes reacted on the side on which the constant stimulus appeared, and sometimes on the side on which the varying stimuli appeared. If a subject's "set" were wrong in this respect, the reaction would be false independently of any failure to discriminate or react according to a recognized convention of the experiment. Reactions with this wrong "set" would be systematically false as long as the wrong "set" persisted.

(b) Other and irrelevant mental process conflict with, block and distort the discrimination reaction that is being studied. The motor process runs off to one hand or the other at random. These of course have an even chance of being superficially correct. Indeed some reactions, in which there was clear indication of irrelevant factors being intruded, were excluded from the averages in spite of superficial "correctness." However, there is no reason to suppose that all or most of the random reactions that chanced to be correct were eliminated in this way, and the number of truly "random" reactions may be nearly twice as great as those objectively appearing as "false."

The series of color differences ranged from red-yellow through a series of oranges progressively approximating the standard red, and denominated, R-Y, R-O, R-O²⁵, R-O⁵⁰, R-O⁷⁵. In the experiments with colors, the number of false reactions in 2200 reactions with each subject varied as follows according to the magnitude of difference in the stimuli:

	R-Y	R-O	R-O ²⁵	R-O ⁵⁰	R-O ⁷⁵
Subject I	2	12	5	5	4
Subject II	12	15	23	16	22

The line lengths studied differed by 3, 2½, 2, 1½, 1, ½ millimeters. The number of false reactions in 2400 observations with each subject varied as follows according to the magnitude of difference in the stimuli:

	Millimeters: 3	2½	2	1½	1	½
Subject I	8	8	10	11	15	13
Subject III	14	19	17	25	50	39

The differences in pitch studied were of 16, 12, 8 and 4 vibrations. The number of false reactions in 1280 observations varied as follows according to the magnitude of difference in the stimuli:

	Vibrations: 16	12	8	4
Subject I.....	3	6	5	13
Subject II.....	4	6	9	24

In all cases save subject I for the colors, there is evident tendency for the false reactions to increase in number as the differences become smaller. This is in spite of the fact that the differences were in all cases above what is ordinarily thought of as a "threshold." It points to continuity between false reactions primarily of the misperception type noted in section 27, and those of the present experiments, which involve associational and motor factors relatively more. The apparatus of Henmon's experiments gave no record of the above false reactions when made; they were indicated by the subject verbally, who was thus always aware of a correct perception of the difference. It may be that correct perception did not become clear until after the false reaction had taken place. In the study reviewed in section 27, Henmon does not discuss the reactions contrary to the perception of the stimuli, and false from the viewpoint of this paragraph. It is still certain that lines must be drawn between ability to *perceive* a difference and ability to *react* to that perception. Or, to put it in more behavioristic terms, the capacity to make a *predetermined correct* reaction to a difference depends on the sort of reaction that is to be made. Other experiments, by the method of right and wrong cases, showed a lower threshold in pitch for II than for I (shorter simple reaction time in II was also found). When the *predetermined correct* reaction is to say whether the second of two tones is higher or lower, II reacts more correctly than I; when the reaction is a conventionalized move with a telegraph key I reacts more correctly than II. And in both cases the capacity for correct reaction is influenced by the magnitude of the difference.

This principle was met at the outset of the study, when it was brought out that reactions under the conventions of experiment might be quite different from analogous processes in the life environment governed by instinctive motives. "A fine target-shot may be a poor game-shot." But it seems that this parallel must be carried further to say that a good shot at one kind of target

may be a poor shot at another kind; a good shot with one kind of ammunition a poor shot with another kind.

Other evidence of perceptual factors in these false reactions is derivable from the reaction times. It is natural that the correct discrimination times should become longer as the differences to be discriminated become less. What is not so foreseeable, is that the time of the false reactions behaves in the same way. It takes longer to react falsely to red-orange-75 than it does to red-yellow. This is *prima facie* evidence that the discriminative process has taken place, and with a difference of this size it would be, *as a discrimination*, presumably correct. But the smaller the difference that is discriminated, the easier it becomes for extraneous factors to distort the required reaction to falsity. The following figures show the increase in false reaction time, roughly paralleling that of the correct reactions. The progression of differences in color, lines and pitch, is as given in the previous tables.

Subject.	—Differences decrease from left to right.—				
I color, false.....214	257	266	240	289	
I color, correct.....217	296	252	260	271	
II color, false.....246	269	236	301	286	
II color, correct.....256	268	274	281	291	
I lines, false.....285	252	303	304	320	348
I lines, correct.....296	298	305	313	323	344
III lines, false.....299	294	317	326	333	345
III lines, correct.....329	328	331	339	346	358
I pitch, false.....282	307	343	356		
I pitch, correct.....290	298	311	339		
II pitch, false.....275	517	428	435		
II pitch, correct.....344	355	396	470		

In the line lengths the average of correct reactions is uniformly longer than that for false reactions, but not greatly so. In other cases the difference is often reversed. As with the false justments of section 27 the time of right reactions differs insignificantly from wrong ones.[†]

29. While only three subjects figured in the above results, there was marked individual difference in tendency to false reaction,

[†] A difference previously reported by Wells in these data seems to rest on an erroneous comparison of the median of false with the average of correct.

I showing fewer than II or III, as follows in the different types of experiment:

	Total for colors.	Total for lines.	Total for pitch.
Subject I.....	28	65	27
Subject II.....	88	...	43
Subject III.....	..	164	..

30. *Henmon's Findings on False Reactions and Practise.*—The unquestionable tendency of practise to diminish the number of false reactions coordinately with increasing reaction speed is not very evident in these experiments. Other series had been taken before these experiments were made, with a view to elimination practise effects, at least for reaction speed. Where more practise effect remains for accuracy than for speed, it indicates that the improvement in accuracy in the function is not so rapid as the gain in reaction time. The situation is sufficiently indicated in the following figures:

	Color		Lines		Pitch	
	Subject: I	II	I	III	I	II
Number of false reactions per series, first half of experiments.....	2.5	10.5	9.4	17.6	3.5	5.0
Number of false reactions per series, second half of experiments.....	2.6	5.0	3.6	15.2	3.3	5.8

31. *Present Material, False Reactions in the Different Experimental Series.*—The measure selected for this comparison is derived by considering the number of times each series was worked with the normal subjects, and dividing by this the total of false reactions observed in the series; thus obtaining for each series the average number of false reactions in it. These figures are,

	Series: 20	10	50	110	100
Number false reactions.....	1.2	1.3	4.1	1.1	1.0

Except for the outstanding position of series 50, no significance can be attached to these differences, nor do they run parallel to the differences in reaction time. It may be noted that while five proper movements are necessary for a correct reaction in series 10 and 50, and only one in series 20, 110 and 100, this fact shows little influence on the relative difficulty of the reactions. The number of false reactions is not significantly different in 20 and 10; the difference which is strongly marked is that between 50 and 10, showing that the essential factor is not the requirement of 1- or 5-finger movements.

32. *Range of Individual Difference in False Reaction.*—The measure selected for this comparison is derived by taking the sum of the false reactions in the *first performances* of the series 20, 10, etc., and dividing it by the number of series under consideration, which is, of course, uniformly 5. This gives the average number of false reactions in a single series per individual. The figures for S and T are approximations, since their series are incomplete, and the preponderance of false reactions in series 50 must be allowed for. The figures are,

	Subject: B	C	E	H	J	K	L
Average false reaction	1.6	1.0	.8	2.4	.6	2.6	2.0
	Subject: M	R	S	T	W	X	Y
Average false reaction .....	.8	2.2	2.2	5.0	.8	2.6	2.5

Subject T had 13 false reactions in series 50 alone.

33. *Speed of False Reactions.*—Comparison of false reaction time with that of correct reactions must be made with reservations. Small numbers of false reactions often make hazardous the statement of central tendency. Also they represent more varying processes than do the correct reactions. There are more ways to do a wrong thing than a right thing, because there are more wrong things to be done. Correct reactions result from following out a restricted pattern of discharge. Incorrect ones have an indefinite number of mechanisms. It remains to inquire if any characteristic manifestation of the disturbing factors is to be found in the reaction time.

That constant relation appears between false and correct reaction time is doubtful. A false reaction made in series 10 or 50 usually makes the *t* time of that response longer than the average, but this may well be a result of awareness of the error. This is manifestly the case where the subject takes time to correct it. Illustrations follow of different anomalies of the time factor in false reactions, without, however, finding in them a criterion of individual difference.

(a) False reactions with comparatively short times:

Item.	Error.	Time.	Central tendency of correct re- actions.
2 + 7 = 9.....	lefthd.	1.14	1.33
Lemons are sour.....	lefthd.	1.47	2.01
Key No. 1.....	key 5	.77	.90

(b) False reactions with comparatively long times:

Item.	Error.	Time.	Central tendency of correct re- actions.
Wood floats on water.... leftd.		3.15	1.53
5 + 8 = 13 leftd.		1.48	1.18
5 + 8 = 13 leftd.		2.00	1.29

In series 10 and 50 a disturbance of the psychomotor adjustment prior to the actual false reaction may be shown in a very short r time or a very long one.

(c) False reactions following short r time.

Item.	Error.	r time.	Central tendency of correct r times.
aoeui	aoeui	.83	1.70
aoeui	aoiui	.69	1.09
aoeui	aoiue	.63	.83

(d) False reactions following long r times.

Item.	Error.	r time.	Central tendency of correct r times.
iaueo	iaoeu	1.14	.62
oaeiu	oeoua	3.57	1.37
iaeou	ioeui	2.98	1.22

Such psychomotor slowing preliminary to false reaction was also noted in observations on typewriting (*Am. J. Psych.*, 1916, 27, p. 58).

A flaw in the instructions to the subjects (pp. 85-86-87) is that they say nothing about what is to be done if the subject catches himself in an error. Several cases occur in the records in which a subject, noting an error, corrected it before going on. It seems worth while to note the time taken to do this. The measure is from the moment the false reaction is recorded to the moment the correct reaction is recorded. These correction times are distributed as follows:

Time in .01 sec:	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140 and over.
No. cases	0	1	1	1	4	3	1	3	2	2	0	1	0	1	5

No correction time in series 10 or 50 is shorter than .70 second. The correction times run distinctly shorter than the reaction times; so much so as to suggest that in several cases the correct adjustment was in process of formation before the false one was com-

pleted in action. The relation of consciousness to the corrective process is more interesting than clear. At the level of practise with which we are dealing, it is hard to imagine so complex adjustments as these running off unconsciously. Occasionally, of course, we have the subject's own immediate and spontaneous testimony to his awareness of the error. But it is by no means sure that the corrective movement is preceded by consciousness. Though awareness normally *accompanies* psychomotor arcs of this level, it need not sustain any constant relation to the motor end-effect in these arcs. The time relation of the whole process is measurable in terms of motor end-effects, but the time relation to awareness is not so measured or measurable.

34. *Topical Data on False Reactions.*—For series 10 and 50 a schedule was made showing the relative involvement in false reactions of the different keys. In series 10, keys 1, 2 and 3 share equally in recording false reactions; keys 4 and 5 less frequently than they. The fewest errors are made when key 3 is called for, the most when key 1 is called for. In series 50, containing about three times as many errors, the distribution is not at all the same. The fewest errors are made when key 1 is called for. By far the most false reactions are recorded by key 3, which in series 10 shared this bad eminence equally with keys 1 and 2. This difference in the distribution of the errors is evidence against their being governed chiefly by *motor* maladjustments.

In series 110 and 100, the subjects as a group showed no difference in reacting falsely to correct and incorrect propositions. Each has about the same number of false reactions. Individual subjects may show a greater tendency to react falsely to one or the other type of proposition. *Lemons are sour* was the only item of series 100 eliciting false reaction in subject J, and did so twice in him. The negatives conduce somewhat to false reaction, *cats have no claws* eliciting false reaction in three subjects. The two false reactions of subject S in this series were to this item and to *roses have no smell*. In such propositions there are pairs of ideas which are strongly associated; and the occurrence of such a pair in a proposition induces of itself a positive attitude.

35. *Correlations in Speed and Accuracy.*—Series 50 afforded the only acceptable opportunity for a correlation of reaction speed

and accuracy. It is somewhat negative for both normal and pathological subjects, the r 's being $-.28$ and $-.21$ respectively. This is patently associated with the beginning of practise, since individuals practised in this kind of reaction are both faster and more accurate than the unpractised.

Other correlations in reaction speed between different series showed such relationships as one would expect. In normal subjects the closest correlation found was between series 110 and 100, r . 50. Between 50*t* and 10*t* it was .41, between 50*t* and 100 it was .20. All are positive, but their moderate degrees are in line with general indications that motor speed is rather specific to the given function.

V. FALSE REACTIONS OF PATHOLOGICAL SUBJECTS COMPARED WITH THOSE OF NORMAL SUBJECTS.

36. *Comparison of Normal and Pathological Subjects in False Reactions per Experimental Series.*—The measure described in section 31, namely, the average number of false reactions per series, is for the pathological subjects as follows:

	Series: 20	10	50	110	100
Number false reactions .....	.7	1.2	2.8	.4	.7

More difference in the liability to false reaction appears than with the normal subjects. Series 110 is relatively freer from them and series 10 has more, 50 having naturally the most. These numbers are derived from all the experiments made. Only one set was made with most of the normal subjects, but with most of the pathological subjects the series were repeated several times.

37. *Comparison of Normal and Pathological Subjects in Tendency to False Reaction.*—The measure described in section 32, the average number of false reactions in the first performance of all series, is for the pathological subjects as follows:

	Subject: 74	75	36	31	71	84	16	17	79	24	86
Av. false reactions....	1.6	.6	.8	1.0	2.6	.6	2.2	1.4	.4	4.6	1.2

The figures for subjects 36 and 31 are approximations from incomplete series.

This result is an emphatic negative to the question whether the pathological group as such is more subject to false reaction than

the normal. There is actually less tendency to false reaction in the pathological group. Of the 11 in the pathological group, eight show fewer false reactions than the normal average. Six of the 14 normal subjects are below their average. Of all persons entering into the results, the most false reactions are made by a normal subject, a physician, and the fewest by a young circular case. It is not possible within the pathological group to show fundamental relationship with the character of the psychosis, though the dementia præcox cases do make fewer false reactions than the manic-depressive.

38. *Other Comparisons.*—Twenty per cent of the false reactions were spontaneously corrected by the pathological subjects; of the false reactions of the normal subjects, 33 per cent were spontaneously corrected. The correction times are somewhat longer in the pathological group, being distributed as follows:

Time in .01 sec.:	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140 and over.
No. cases	0	0	0	1	3	2	2	0	1	2	3	0	2	1	13

Thirteen times are over 1.40 seconds as against five with the normal. Three cases appear in which a reaction was correctly made and then falsely changed. They are the following, one appearing premature:

Item.	Correct reaction.	Elapsed time to false reaction.
5 + 8 = 13.....	1.13	1.04
7 + 8 = 15.....	.09	1.24
5 + 9 = 15.....	2.06	1.25

As with the normal subjects, no difference is found in the number of false reactions made with the right and left hands. No comparisons are made upon the other points noted from the normal subjects.

VI. PATHOLOGICAL RECORDS IN RELATION TO THE CLINICAL CONDITION OF THE CASE.

39. As experiments with single pathological subjects might extend over periods of many weeks, one would naturally expect to encounter some fluctuations of condition. It was thought worth while to examine the results, and compare them with clinical observations, to see if any such fluctuations were reflected in the experi-

mental performances. Findings on this point will be briefly presented for each subject.

Case 76, age 36, typical dementia præcox on a shut-in basis. Early in the psychosis he showed a wealth of paranoid ideas of religious and sexual coloring. Since then delusion formation seems less active, though still brought out by questioning; characterized at the time of the experiments by passive acceptance of his situation, and vague delusions. In the midst of this he was singularly amenable to laboratory conditions of all sorts, following their routine almost like a ritual. His condition throughout the time of the experiments was quite stable. No change of condition or attitude is noted either by the experimenter or in his clinical records.

The experiments were made on six days, five weekly in January and February, one towards the end of March. A variation outside the limits of chance or practise appears on the fourth experimental day when very short times are recorded in every series, and again two days later in a repetition of series 110 and 100. There is no evidence of correlated change in the patient's mental economy. This case produced very few false reactions, much fewer than the normal average. This was striking to observe in a case whose more vital adaptations were so completely broken down.

Case 17, age 36, is a dementia præcox case of more recent standing. At the time of the experiments emotionally depressed, slovenly in habits, delusion formation rather slight. The two experimental days are only a week apart and no significant change is reflected in notes or experiments. There was more agitation in this case than in 75, and this is the most plausible interpretation of the considerably greater tendency to false reaction.

Case 74, age 26, is a typical manic-depressive case with circular attacks, the present being the fourth. It belongs among the mixed phases, showing overactivity and flight along with depression of mood. Complete records are at hand for two days, some 11 weeks apart; both the clinical notes and those made during the experiments point to somewhat greater excitement at the time of the second experiment. The difference between the experiments is marked, the second showing the greater speed, and slightly fewer false reactions.

Case 36, age 22, is one of a similar character so far as present interpretations are concerned, manic-depressive on a psychopathic basis, but the excitement is more typical. Two experiments, three weeks apart, were made during a period of apparently subsiding excitement. The effect is opposite to that indicated in the previous case, the less excited record showing much shorter times than the first. The change seems too marked for a practise effect in the ordinary sense of the term. Four false reactions occur in the first experiment and none at all in the second, in accord with expectation.

Case 16, age 39, is another circular case in a fifth attack, excited phase. Four experiments are recorded during a period of slightly over three months. The general course of the psychosis during this time was one of subsiding excitement with occasional relapses, or even flurries of depression. The immediate experimental notes show distinct excitement for the first three experimental days, which had considerably subsided at the time of the last day. The reaction speeds are irregular, and no difference can be traced in the records except that the third and fourth experiments show somewhat shorter times than the first and second. There were many more false reactions in the earlier experiments; 12 and 15 as against one and four.

Case 79, age 20, is another circular manic-depressive, who, during the period of three and one-half months covered by the experiments, passed from a slightly depressed condition into an excitement too great for laboratory observation, and then again into a mildly depressed state. He was perceptibly keyed up on the third experimental day, more than on the first or second. Complete records for these first two days are not available; but the third day shows comparatively lengthened times in 107, 110 and 100; shorter times in 107 and 20. There are also more false reactions, especially in 100. Compared to the later changes in his condition, which ended in recovery from the attack, this third series, under excitement, shows longer times throughout, and the fifth experimental day marks improvement over the fourth, which preceded by some six weeks. False reactions are again practically eliminated.

Case 24, age 45, represents a progressing recovery from a mild depression. Clinically, it may be regarded as certain that the depression was less on the second of the two experimental days; they were two weeks apart. In general the reaction times are also shorter on the second day, but a more noticeable change is that the false reactions, 23 on the first day, the greatest number but one observed for any single experiment, diminished in the second experiment to seven.

Case 71, age 20, is of marked constitutional neuroticism associated with psychotic episodes whose diagnostic interpretation is not wholly clear. Like 75, he is a rather critical case for an inquiry like the present, his condition being one continued maladaptation, without observed change during the period of the experiments, and without likelihood of reaching a normal adjustment to life. Three experiments were made at intervals of about a month. The first two have slow speed and many falsities, the third is fairly quick with no falsities. Notes on the third experiment are lacking, but it is safe to say that the long times in the first two as such are not significant for present purposes. They are associated with unusual clumsiness on the motor side of his adjustment to the experimental task. Thus, contrary to instructions, he fingered unsystematically in series 10 and 50, this compelling him to work by sight. This inefficiency is of a "motor" rather than a "psycho-motor" level.

About 18 months later this case voluntarily presented himself for further examination, saying he had not really tried in the previous tests, and now wished to establish his sound mental condition. He manifested much concern over their outcome. Reaction speed was greater in series 10 and 50, slower in series 110 and 100, than in the previous experiment. There were also six false reactions in this fourth experiment as opposed to none in the third. The gain in 10 and 50 is fully accounted for in that the subject now fingers systematically, according to instructions. Though the notes of the third day are not found, it seems probable that the greater speeds of the third day are also due to improvements of this kind. The gains are not correlative to change in the psychotic constitution of the patient; they represent more willing cooperation, better adjustments of strictly motor character, or both.

VII. CRITICISM AND CONCLUSION.

Dementia præcox and manic-depressive psychoses show certain types of reaction to the environment. Certain individuals react in these ways because their adaptive capacity is not equal to the demands the environment puts upon it. When this capacity is strained to the breaking point, the psychosis is precipitated. Dementia præcox seems to be precipitated chiefly by the sexual adjustments called for upon attaining maturity in the presence of incapacity for making them. A definite type of predisposition to this reaction has been made out—the “shut-in personality.” The manic-depressive psychosis represents more temporary withdrawals from reality. Sometimes, as in cases here studied, psychopathic defect is evident when the patient is “normal” for him. In other cases, no psychopathic traits have been found except in the definitely psychotic periods. In the dementia præcox group, and in the present manic-depressive cases, we have to deal with individuals whose maladaptation to life is constitutional.

There are two sides to the question of demonstrating this maladaptation at the psychomotor, laboratory, conventional level. If it is so demonstrable, we shall expect to find it most marked during periods of actual psychosis, where the present study has looked for it. Finding psychomotor deficiency here, the logical progress of the investigation would take up manic-depressive psychoses during periods of recovery, prospective dementia præcox cases before onset, or during remission.

Failing to find such psychomotor deficiency, the most reasonable interpretation is that the factors (instinctive, emotional, volitional) upon which psychosis or sanity depends, are essentially dissociated from the superficial psychomotor capacities represented in these experiments. (It is possible to suppose a sort of compensatory relation between the two, but the conjecture cannot here be profitably discussed.)

Independence and dissociation of the functions governing vital adaptation from those governing psychomotor adaptations is the chief indication of the present results. Their inter-relationship should have shown itself most clearly in a greater tendency of the psychopathic cases to false reaction. The contrary was found, and cases of the more serious maladjustment, dementia præcox, actually showed the fewer false reactions.

While the psychomotor adaptations of the pathological cases, as a group, take longer time than those of the normal, a simpler explanation of this is indicated than that of constitutional difference between the two groups. If this difference in the two groups is one of constitution, it ought to persist with relative independence of the patient's immediate clinical status. The evidence we have points in the opposite direction. The psychomotor adjustments are too dependent on symptomatic and incidental factors of the condition to be regarded as the expression of constitutional tendencies. Both reaction time and false reaction contribute data on this topic. Of the dementia præcox cases, 75 was much more broken-down mentally than 71, but 75 was emotionally calm, while 71 was agitated. The result that 71 was quicker but made more false reactions than 75, is easier to reconcile with the immediate emotional factor. In case 16, a period of clinically subsiding excitement corresponds generally to a shortening of reaction time and great reduction of false reactions. The change is best interpreted as a lessened distractibility. In case 79, false reactions increase with the state of excitement, and are eliminated with its subsidence. In case 24, they decrease markedly with a subsidence of depression. The rule is improvement with the subsidence of superficial symptoms, such as would themselves cause a poorer performance. An exception is shown in case 26, where better performance is shown in a somewhat greater excitement. Thus the changes in the pathological groups appear to result from factors secondary to the psychosis. When these factors disappear, the psychopathic constitution of the cases does not differentiate their experimental performance from the normal.

From the standpoint of the experiments it is not a fortunate circumstance that such practise as there is in the experiments generally coincides with periods of improvement. The meager control data point to considerable variation from day to day in the normal, not consistently in either direction. This is true for both speed and false reactions. Consistent improvement in the performance of pathological cases associated with improvement in clinical status seems better explained by this than by practise effects, especially when the experimental days are far apart.

That these pathological groups are not constitutionally differentiated from the normal on the psychomotor level, is the most

certain result of this study; the departures from the normal which are seen may, with reasonable probability, be related to symptomatic features of the disorders. In formulating results beyond this, one is hampered by insufficiency of data. Many things were found, and are stated in their appropriate sections, but they require substantiation from further work before assuming general validity.

Among these may be recalled the singular separation of the normal from the pathological groups found in the statements of natural fact (series 100) and the greater difficulty experienced in the pathological group with incorrect statements of both natural and mathematical fact. The greater tendency of normal individuals to spontaneous correction of false reactions might also be mentioned because of the more natural and unconventional character of this response.

It has been postulated that a false reaction is as such a more pathological performance than a slow one. But it has clearly not the same sort of pathology that is concerned in the manic-depressive and dementia præcox psychoses. It originates on a more superficial level. The false reaction results from an incidental disturbance of mental processes, and the susceptibility to false reactions is a measure of constitutional liability to such disturbances. It has been shown that this is a different constitutional character from that which makes for certain functional psychoses. It has been difficult to acquire knowledge as to the positive meaning of susceptibility to false reaction because no satisfactory measure of individual difference in it has existed. Under ordinary conditions of experiment one does not get enough false reactions to serve as a basis for comparison. They deserve consideration in other rôles than as a disturbing element in studying the time of correct reactions. To study them in and for themselves one should have conditions more favorable for their occurrence, the usual experiment being designed to favor correct reactions.

One means of bringing out more false reactions is to increase the complexity of the reaction patterns. This is the effect in the use of the typewriter, though that instrument has obvious limitations on account of different individual capacities due to special practise. Comparable to increasing the complexity of the reaction

patterns is diminishing the differences in the stimuli to be distinguished, approaching the border-line where misperception becomes a greater factor in the false reaction than maladjustment of the psychomotor mechanism.

The greater space in this study has been given to reaction time, because the nature of the experiments was such as to yield more material on it. Item for item, the tendency to false reactions is the more suggestive. There are very few situations in practical life where anything depends on the small amount of individual difference that exists in reaction time. There is usually time enough to pull the right lever; the important thing is to pull it in the right direction, or not to get hold of the wrong one. The opinion must be reiterated that the facility of time measurements has led to their playing a part in psychology disproportionate to their value for the study of the mind, while measurements of correctness in choice have had too little attention. The present study in the pathology of choice reactions results in delimiting the problem in reference to the psychoses. The pathological features seen in the choice reactions of psychotics are secondary to incidental symptoms. The problem is to be approached for its relation to normal psychology; to the "psychopathology of every-day life." With this it has as many points of contact as there are systematic choice reaction processes in the conduct of civilized life, and these are without number.

SOME FAMILIAL AND HEREDITARY FEATURES OF AMAUROTIC IDIOCY.

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Within the last few years, a study has been made of 12 families in which occurred cases of amaurotic idiocy, in order to determine, if possible, the hereditary, familial and social features of the disorder with the hope that perhaps such a study would help to solve the much discussed and important question of the nature of the disease process and its racial psychopathology. My former studies¹ on amaurotic idiocy have been limited to its clinical aspects and to a discussion of some new symptoms of the disease, particularly certain reflex phenomena which were interpreted as being produced by the removal of inhibitions in the central nervous system caused by extensive destruction of the neuro-fibrils. The racial psychopathology of the disorder, its practical limitation to children of Jewish parentage and the social aspects of the disease, open up problems which have been very difficult of solution. It was with the idea of contributing to a new theory of the disease, based upon a conception of organ inferiority, that the following study was undertaken.

The following is the outline of the 12 families studied, nearly all of which have been seen and examined in person.

FAMILY HISTORIES IN AMAUROTIC FAMILY IDIOCY.²

FAMILY I.—The father and mother are Russian Jews. Father non-alcoholic and non-syphilitic. Maternal grandfather, a Russian Jew, became blind at 30, before birth of the mother. Maternal and paternal grandparents otherwise healthy. No consanguinity of parents. Later the mother showed symptoms of hyperthyroidism, but in time this disappeared and she developed a typical neurasthenia.

¹ Isador H. Coriat: Amaurotic Family Idiocy, Archives of Pediatrics, June, 1913. Some New Symptoms in Amaurotic Family Idiocy, Boston Medical & Surg. Journal, July, 1915.

² The cases in Families V, VI, X, XI and XII are from the Neurological Clinic of the Children's Hospital.

Children in family, 6.

1. Girl, 8 years, healthy.
2. Girl, $5\frac{1}{2}$ years, healthy.
3. Boy, $3\frac{1}{2}$ years, healthy.
4. Girl, 23 months. Amaurotic family idiocy.

5 and 6. Twins (boys) born after death of the amaurotic idiot, showed no signs of amaurotic idiocy even after repeated examinations, and at the age of two, remained normal and healthy with normal fundi. An analysis of a specimen of the mother's milk showed it to be normal in chemical composition. No miscarriages and no children have died except the amaurotic idiot, who died suddenly from bulbar paralysis. All the children were breast fed.

FAMILY II.—Father and mother, Russian Jews. Mother was 24 years old when the patient was born, father 33. Father has been nervous concerning business matters. Maternal and paternal grandparents healthy. No consanguinity or nervous or mental disease in family.

Children in family, 3.

1. Girl, 6 years, healthy.
2. Miscarriage with dead child at 9 months.
3. Boy, 17 months, amaurotic family idiocy. All the children were breast fed.

FAMILY III.—Father and mother, Russian Jews, healthy, no consanguinity, no syphilis. All the grandparents healthy. Maternal granduncles are brothers. The maternal granduncle (mother's father's brother) had a son who died from amaurotic family idiocy (the boy in Family II) and is therefore a second cousin to the girl in Family III, who had the same disease.

Children in family, 2.

1. Boy, died when eight days old of subdural hemorrhage.
2. Girl, amaurotic family idiocy.

FAMILY IV.—Father and mother are Russian Jews. Mother neurotic. Father a weakling. No miscarriages of mother.

Children in family, 5.

1. Girl, 22 years, anxiety hysteria.
2. Boy, 16 years, weak heart.
3. Boy, 14 years, feeble-minded, juvenile delinquent, stammering, disseminated choroiditis.
4. Boy, died at 21 months of amaurotic family idiocy and hydrocephalus.
5. Boy, died at 20 months of amaurotic family idiocy, hydrocephalus and rickets. The two boys with amaurotic family idiocy were both born in America.

FAMILY V.—Father and mother, Russian Jews, healthy. All the children breast fed.

Children in family, 8.

One boy died at three weeks, not blind. Two boys died at one year, blind (amaurotic family idiocy?). Boy, amaurotic family idiocy, died at the age of 15 months. Ages and sequence of the other children unknown.

FAMILY VI.—Father and mother healthy. No consanguinity. A second cousin on father's side was a case of dementia præcox with hysterical episodes.

Children in family, 2.

1. One healthy.
2. Boy, had amaurotic family idiocy.

FAMILY VII.—Maternal and paternal grandparents healthy. Father, syphilitic and died of tuberculosis. Mother, hysterical. No consanguinity. Ancestors born in Russia, the others in America. All the children were breast fed.

Children in family, 5.

1. Girl, 13 years, healthy.
2. Girl, 7 years, healthy.
3. Boy, died of amaurotic idiocy and also had a probable cretinism.
4. Boy, typical amaurotic idiocy and rachitis.
5. Girl, apathetic, had optic atrophy with strange position of optic nerve, partially blind.

FAMILY VIII.—Father and mother Polish Jews. No consanguinity. The family history concerning nervous and mental diseases is negative.

Children in family, 4.

The mother had three children by first husband, one boy and two girls, all healthy. Mother highly myopic. Husband also married twice, no children by first wife. Patient (a boy) was a typical case of amaurotic idiocy and is the first and only child by second marriage. Breast fed.

FAMILY IX.—Father and mother and all the ancestors are Russian Jews. Maternal grandfather died of heart trouble. No nervous or mental diseases of father, mother, grandparents, uncles, aunts or cousins.

Children in family, 3.

1. Boy, still born at full term.
2. Girl, 4 years, healthy.
3. Girl, had typical amaurotic idiocy.

FAMILY X.—*Children in family, 2.*

Only two children in family (boy and girl) both of whom had amaurotic family idiocy.

FAMILY XI.—No consanguinity of parents and no nervous or mental disease. Russian Jews. All the children were breast fed.

Children in family, 7.

One died at 27 months of amaurotic idiocy. Within three years, *twins* were born, one (a girl) at one year showed typical amaurotic idiocy, the other twin (a boy) was perfectly healthy. The other four children were healthy.

FAMILY XII.—*Children in family, 4.*

Four children. Two healthy. *Twins* (one boy) had amaurotic idiocy, the other boy died soon after birth, cause unknown.

An analysis of these 12 families reveals some interesting material. There were 51 children in all. The pathological cases in both the adults and children, may be grouped as follows:

Amaurotic family idiocy, 15 cases.

Optic atrophy, 1 case.

Died at one year, blind, 1 case.

Stammering and disseminated choroiditis, 1 case.

Blind at 30, 1 case.

Hyperthyroidism, 1 case.

Subdural hemorrhage, 1 case.

Anxiety hysteria, 1 case.

Dementia præcox, 1 case.

Syphilis and tuberculosis, 1 case.

Hysteria, 1 case.

If we add to the 15 genuine cases of amaurotic family idiocy the cases of optic atrophy and also the child who was blind at the time of its death when one year old, as being in all probability the same disease, we have 17 cases of amaurotic idiocy out of 51 children, or 33.3 per cent.

The outcome and clinical features of some of these cases of amaurotic idiocy, where it was possible to study them over a long period of time, presented certain points of interest. The disease was nearly twice as frequent in males as in females, in the proportion of 11 boys to 6 girls. The course of these cases, in the various families designated, is as follows:

FAMILY I.—(Girl.) Hydrocephalus, abnormal reflex phenomena,^{*} bulbar symptoms, nystagmus, typical fundus changes, rigidity of limbs, emaciation. The child died suddenly when 2½ years old of bulbar paralysis.

FAMILY II.—(Boy.) Typical case with abnormal reflex phenomena. The child died at 20 months of emaciation and broncho-pneumonia.

FAMILY III.—(Girl.) The child was still living at the age of 18 months, but had grown feebler and shown marked rigidity of the limbs.

FAMILY V.—(Boy.) Typical case. Died at 15 months, cause unknown.

FAMILY VII.—(Boy.) Typical case with atypical fundus changes (optic atrophy with grayish-purple area in the macula) and constant nystagmus. The child was living at the age of 3½ years, but was markedly rachitic. The other child in the family, a boy, died of marasmus, while the sister was living at the age of 2½ years, but was apathetic, had an optic atrophy and was partially blind.

^{*} For description of these abnormal reflex phenomena, see my paper, "Some New Symptoms in Amaurotic Family Idiocy," *loc. cit.*

FAMILY VIII.—(Boy.) Typical case. The child died at the age of $1\frac{1}{4}$ years, cause unknown.

FAMILY IX.—(Girl.) Typical case with abnormal reflex phenomena and lateral nystagmus. The child died at the age of $1\frac{3}{4}$ years, much emaciated.

It will be noted that emaciation and marasmus was a frequent feature of the disease as a terminal disorder and in a large majority of cases, was fatal in its outcome.

It is very doubtful if genuine amaurotic family idiocy, according to my experience, can be found among Christian children, or if so, it is so rare, that it is extremely improbable that one-third of Christian children in the families in which the disease is alleged to have occurred, could suffer from the disorder, as in the Jewish families. The cases in non-Jewish children are far less characteristic than in Jewish, in that the eye findings are less typical and in many instances the diagnosis remains doubtful.

Out of 86 cases amaurotic idiocy collected by Vogt* there were 61 Jewish cases, seven Christian cases, while in 11 cases, the race was not designated. One of the Christian cases, a girl 11 months old, showed an autopsy tubercles of the corpora mamillaria and tuberculosis of the internal organs, this limiting the cases occurring in non-Jewish children to six. In a case recorded by Williams,[†] the clinical pictures of amaurotic idiocy was simulated by a tumor of the interpeduncular space. In the cases reported by Wandless* occurring in an Irish family, the findings rendered the diagnosis of amaurotic idiocy extremely doubtless, since the onset was late, at about eight years of age, the changes in the macular region were not characteristic, while the cytological alterations were not typical of the disease.

The results in Mongolian idiocy are exactly opposite, for instance out of 37 cases of Mongolian idiocy, in only three of these were the parents Jewish. The largest number of cases of Mongolian idiocy seem to occur in children of Irish birth or descent.

*Heinrich Vogt: Ueber familiäre amaurotische Idiotie und verwandte krankheits bilder, *Monat f. Psychiatrie und Neurologie*, August, 1905.

†E. C. Williams: *British Journal of Children's Diseases*, October, 1907.

*H. W. Wandless: *Amaurotic Family Idiocy*, *New York Medical Journal*, May 8, 1909.

In all the families in which amaurotic idiocy occurred, there was a strong neuropathic or psychopathic background, in the form of juvenile delinquency, stammering, disseminated choroiditis, dementia præcox, hysteria, syphilis and tuberculosis, although concerning the two latter, none of the cases of amaurotic idiocy could be said to be tubercular or syphilitic in origin.

Now what is the cause of this disease and why does it seem practically limited to Jewish families, particularly to those families which have been subjected to persecution with its attendant emotional strain. The disease occurs not only in the immigrant Russian Jew in America and England, but is likewise reported from Russia itself.⁷ In none of the families studied was there any history of consanguinity.

The pathology of the disease seems to offer the best explanation for its nature and origin. In amaurotic family idiocy the cells are large, pale and swollen, practically the same cytological changes as are found in Cajals foetal cells, which can be demonstrated in post-embryonic life in idiocy, juvenile paresis, congenital syphilis and in certain familial types of infantile spastic paraplegia. These cells appear in the cortex from the third to the fifth foetal month. As early as the sixth foetal month, they begin to show regressive changes, until in the last month of foetal life and in the brain of the newly-born, they have completely disappeared.⁸

In a careful anatomical study of a case of amaurotic idiocy, Naville⁹ calls attention to the fact that the brain was of the foetal type. This was shown by the poverty of the white substance in relation to the gray, and in addition, the myelinization of the brain was that of a foetus of from 6 to 7 months.

However, in the organic brain diseases already indicated they persist, and the cell changes in amaurotic family idiocy strongly

⁷ See on this point the six cases described by Kowarski (Jahrbuch f. Kinderheilkunde, July, 1912) from Wilna, Russia. He states that 21 cases in all have been reported from Russia.

⁸ Joseph Gortsmann: Beitrag. zur Kenntniss der Entwicklungsstörungen in der Hirnrinde bei genuiner Epilepsie, Idiotie, juvenile Paralyse und Dementia Præcox, Abh. d. Neurol. Inst. der Wiener Universität, Bd XXI, H. I. 2: 1914. 1916

⁹ F. Naville: Etude Anatomique du Névrose dans un Cas d'Idiotie Familiale Amaurotique de Sachs-Schweizer Archiv. für Neurologie und Psychiatrie I, 1917.

resemble the persistent foetal cells of Cajal. So the child born with these persistent foetal types of cells, is, from the neurological standpoint, an under-developed child, it possesses an inferior nervous system and this nervous system is unable to withstand the various stimuli which are suddenly poured into the brain of the newly born infant through the various senses and from contact with a new environment. As a consequence, after a certain time, there follows a rapid deterioration. In other words, the disease is developmental, arising on the basis of an inferior brain. Obersteiner¹⁰ has shown, that the anatomical findings in hereditary ataxia, amaurotic idiocy and other nervous diseases, are also developmental in nature.

The relation between amaurotic idiocy and other familial diseases of evolution is clearly shown in the Jewish family of four sisters reported by Higier, in which there were two cases of essential optic atrophy, one case of the cerebellar ataxia of Marie with an optic nerve atrophy and one case of amaurotic idiocy with the typical macular changes. There was no consanguinity and no history of syphilis.

Why amaurotic idiocy should be practically limited to Jewish families, is very difficult to understand, unless we assume that the Jew possesses certain racial characteristics of organic inferiority through which he differs from the non-Jew. Whether or not the Jew is a racial unity, has been the subject of long and hair-splitting controversy and is by no means settled. From the standpoint of physical anthropology, it has been claimed by some that the Jew does not conform to any one racial type, that he is merely a diversified group bound together by a common faith, whereas others state that the Jew is a distinct psychic unity, which alone can be taken as a safe criterion of any race.

In amaurotic idiocy, the inferior organ is the brain, particularly the visual system. As a rule, there is a strong background of neuropathic and psychopathic tendencies in all these cases, so much so, that in certain of the offspring, something is lacking, in other words, in a Mendelian sense, amaurotic family idiocy is a recessive disease. Since the germ cell is the carrier of hereditary

¹⁰ Obersteiner: Die Bedeutung des endogenen Factors für die Pathogenese der Nervenkrankheiten-Neurol. Centralblatt, Bd. 34: 1915.

traits, therefore in these cases, the cell fails to carry something and consequently the brain with its neuronc architecture, becomes an inferior organ. Not all the children have the disease, some in the family escape, while the afflicted ones are born with an inferior brain. The high percentage of amaurotic idiocy in Jewish families is probably due to the fact that the Jew possesses a greater tendency to special types of organ inferiority in the central nervous system than the non-Jew. Why one twin should have the disease and the other be free from it (as in Families XI and XII) can be explained on the basis of binovular pregnancy, whereas if the pregnancy were uniovular, the twins would either be free from the disease or both would have it.

Adler's work on organ inferiority seems in its various methods of approach, to offer the best theory of the disease. As stated by Adler:

I lay stress on the fact that organic inferiority includes incompleteness in such organs, the frequently demonstrable arrests of development or functional maturity, the functional failure in the post-fœtal period and the fœtal character of organs and systems of organs. With the release from the maternal organism there begins for these inferior organs or systems of organs the struggle with the outside world, which must of necessity ensue and which is initiated with greater vehemence than in the more normally developed apparatus. This struggle is accompanied by greater mortality and morbidity rates.¹¹

A certain probability, which is in accord with biological conditions, would have it appear that fundamentally just the most highly developed differentiated cells and cell complexes have come out the worst, while the tissues of lesser capacity, which owe their development to an earlier embryologic epoch, may be normally or even supernormally developed. . . . But just as often, perhaps the hour comes when the insufficiency of the organ is revealed, when the external and internal hindrances can no longer be controlled. The normal structure and wear and tear of the organ give place to regressive phenomena, which are just as much determined in their nature by the morphologic inferiority of the organ, as by the special causes setting the disease in action. . . . Organic nerve diseases, however, are, according to our premises only special cases in which the localized inferiority is inclined to inflammatory or degenerative transformation.¹²

The theory that the disease is due to an organic inferiority of the central nervous system, harmonizes with Shaffer's conception

¹¹ Alfred Adler: *The Neurotic Constitution*, 1917.

¹² Alfred Adler: *Study of Organ Inferiority and its Psychological Compensation*, 1917.

in his painstaking studies of the disorder. According to Shaffer,¹³ the wide extent of the pathological process and the primary character of this disease point to a subnormal development of the nervous system, which tends to degenerate when called into function. One of the most striking features of the disease is that neither vascular nor infectious processes play any part in its production, neither is there any evidence for the assumption of an auto-intoxication or a polyglandular disorder.

This theory of organic inferiority has also been recently utilized to explain some of the perplexing problems of paresis.¹⁴ Here however, we are dealing with a parenchymatous syphilitic infection of the nervous system, while in amaurotic idiocy, so far as we are able to judge from clinical and pathological material, a toxic or infectious origin may be eliminated. Concerning this application of Adler's conception to the problem of paresis, Osnato states as follows:

It has for many years puzzled psychiatrists and other clinicians, why it is that of the great number of persons who are infected with syphilis, only a few, probably less than 3 per cent of the total number of syphilitics, eventually end as paretics. If we, therefore, postulate in these patients the presence of a defect in the nervous system, particularly the brain, which exists either as an hereditary or acquired weakness, then Adler's conception of organic inferiority helps to explain the problem. Adler conceives that the neurotic is somatically inferior, also that this inferiority affects more than one organ and that, as an overcompensation medium, the central nervous system is always involved. In other words, if one can prove before the onset of his psychosis, the psychotic patient is practically always a neurotic, then we can go further and say that paresis has developed in him because the central nervous system is an inferior organ and the inferiority seems to determine the location of the characteristic destructive process caused by his syphilitic infection.

In amaurotic idiocy we are confronted with a similar problem. The entire central nervous system of the potential amaurotic idiot at birth is an inferior organ, as shown by the fact that the characteristic morphological changes of the disease are found not only in the cells of the motor cortex and in the Purkinje cells

¹³ K. S. Schaffer: *Zur Pathogenese der Tay, Sachs' schen amaurotischen Idiotie*, Neurol. Centralblatt, 1905.

¹⁴ Michael Osnato: *Personality in Paresis*, Journal American Medical Association, Vol. LXX, No. 7, Feb. 16, 1918.

of the cerebellum, but likewise in the anterior horn cells of the spinal cord and in the ganglionic layer of the retina. Furthermore, the frontal cortex and the pyramidal tracts, which are myelinated late, are as badly affected as the visual cortex which is myelinated early, probably in the ninth foetal month. In all these cases also, as detailed in the family histories, there is a strong neurotic and psychopathic background.

An organic or functional inferiority of the nervous system in certain individuals of Jewish birth or descent, probably explains the affective make-up of the Jew with his exaggerated emotional reactions. This elucidates his liability to the functional psychoses and the psychoneuroses, particularly those disturbances of the sympathetic nervous system so often designated as Jewish neurasthenia or Hebraic debility. As a result of this inferior sympathetic nervous system, he becomes abnormally sensitive to emotions, leading to palpitation of the heart, flushing, gastro-intestinal disturbances, trembling, sweating and fatigue, in other words the typical picture of Jewish neurasthenia dependent on emotional stimulation of the ductless glands, probably the adrenal system. Cannon's statement may be applied to this group of cases:

It is possible that disturbances in the realm of the sympathetic, although initiated by nervous discharge, are automatically augmented and prolonged through chemical effects of adrenal secretion.³⁸

Since from a therapeutic standpoint, amaurotic idiocy is a hopeless disease and always has a fatal outcome, usually from an intercurrent disorder occurring during the terminal marasmus, we ought, if possible, to direct our efforts to prevention of the disease. But here again, prevention of the disease presents just as hopeless and pessimistic a problem as the therapeutic attempts. We do not know when a case of this disease may suddenly appear in a family of healthy children and even if the disease is recognized in its early stages, any attempt to retard its development is just as hopeless in this stage as in a later period of the disorder.

Referring again to the family histories, it will be noted that in none of the families, did the first-born child or the first few children have amaurotic idiocy. There was only one exception

³⁸ W. B. Cannon: Bodily Changes in Pain, Hunger, Fear and Rage, 1915.

to the rule, namely, in Family VII. In this case the mother had three healthy children by her first husband, but only one child with her second husband. This child was an amaurotic idiot, which would suggest that the cause of the disease lay in the father rather than in the mother. It seems also from an analysis of our material that the disease appears suddenly after a group of otherwise healthy children, but its appearance cannot be predicted and once the disease appears, it tends to repeat itself in the children that follow, as two or even as three successive cases of the disease. In only one family were healthy children born after the disease had once appeared.

We may safely assume then, that the sudden appearance of the disease is in the nature of a recessive mutation, which follows a sequence of normal children. The disease appears, not because of repeated pregnancies in the mother, since the same repeated pregnancies may occur in non-Jewish families where the disease is absent, but because the child is born with an inferior central nervous system. It is this inferior nervous system which undergoes the rapid degeneration which leads to this serious and fatal disease. Not only are the pyramidal tracts affected, as shown by the spasticity and the hyperacusis, but the frontal lobes as evidenced by the dementia and finally the peripheral and central visual neurones, leading to the optic atrophy, the macular degeneration and the consequent blindness.

For this organic inferiority as the basis of amaurotic idiocy, there is no attempt at compensation, since a compensation or repair would be impossible in the presence of the rapid and fatal degenerative processes in the central nervous system.

THE RELATION OF ALCOHOL TO MENTAL STATES.*

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I have been requested by your secretary to deliver a short address upon the subject of alcohol in relation to various mental conditions, in order to stimulate a discussion upon this point, and, as may be known to some of my hearers, I have been engaged during the greater part of my professional life in the study and care and treatment of mental departures from health, much of which was due directly to the excessive use of alcohol, although probably more was indirectly due, or in close relationship to, its employment as a common beverage. From the point of view of personal experience therefore, it may be appropriate and pertinent that I should endeavor to stimulate a debate and thus to elicit the views and the opinions of others among my audience whose experience may well supplement my own. I propose to deal with the subject in a controversial rather than in an authoritative manner, and to divide my theme into two sections: Firstly, the evident meaning attached to my title, viz., the different forms of mental abnormality resulting from excessive drinking in the individual, and secondly, the different mental states exhibited, or the different points of view adopted by the community responsible for the methods of its sale and use, and as a consequence for the maintenance of public order. In dealing with the latter section I shall pass in review the different legal measures that have been adopted to control its sale and the various steps that have been taken to safeguard the health of the people in connection with it.

The question of the effects of alcohol upon the human organism is an important medical point as well as being an interesting economic and sociological one; for it has a concern with the vitality and with the output of work of the individual, as also with his relation to the state which protects him and of which he forms a component part. As to the use of alcohol in health, all experiments are in accord, and it would be useless to occupy space with a repe-

* Read before The Society for the Study of Inebriety in England, January 8, 1918.

tition of the results obtained. Broadly, they are, that alcohol stimulates the heart and circulation; in other words, it increases the force and frequency of the pulse and the functional activity of the nervous system; but it tends also to lower the temperature of the body, because it checks tissue changes. It is evident, therefore, that we have in alcohol a drug which can afford temporary relief in certain abnormal bodily states, but the very relief afforded in one particular direction, viz., as a cerebral stimulant, doubles the temptation to its frequent use, and as the body becomes habituated to its action and the dose has to be increased more and more, the habit of frequent stimulation grows almost of necessity into drunkenness. For this reason I am of opinion that no physician is ever justified in prescribing alcohol for its purely soothing, stimulating or narcotic effects, and I have never used it nor advocated its use for the mental conditions described as painful emotional states, because I consider its legitimate use to be for those extremely serious nutritional disturbances such as threaten to be the last moments of life, and in these states I have known it to prolong the life struggle. Personally I have no sympathy under ordinary circumstances with the daily use of alcohol by healthy persons who are not beyond middle life, and even such use in health has moral and politico-moral issues which cannot be discussed here; but under conditions of unaccustomed exposure to wet and cold, when the extremities are numbed and have lost or are losing their proper feeling, I have been informed by both officers and men from the trenches that the "rum ration" has enabled these men to withstand the continuous exposure to intense cold and wet. This fact is not in contradiction of the physiological experience already quoted, that alcohol lowers the body temperature and has no heating power. It only means that the chill of sudden exposure, the stiffness from benumbed extremities and the bronchitis that may follow are the result of cold, which drives the blood from the skin and the general surface of the body to the extremities; that as a consequence of long exposure the circulation fails in the skin, the functions of which are suspended, with the result that the skin ceases to excrete the body waste normally carried out with perspiration, and that these waste products are thrown upon the internal organs, which are already in a state of passive congestion. The relief obtained is properly explained by

the physiological effects of alcohol which maintain the increased circulation and keep the external surface supplied with fresh, warm blood from the internal and engorged bodily organs. The obvious danger of prescribing alcohol in health is to induce intemperance; but it is only right to state that intemperance is also often the effect of brain weakness and brain disease; indeed, some writers have gone so far as to state that in practically all cases of mental disease associated with intemperance, the latter is a consequence of mental weakness and not the cause—a statement which is probably less than half the truth.

In regard to alcohol, physiology teaches us that alcohol is primarily a strong dehydrating agent. It takes away water from living matter, and as a fixed amount of water is a necessity for the life of a healthy protoplasm, this dehydrating action must prove to be highly injurious, hence its effect upon living tissues is to cause a degeneration and decay, which can be seen in the pyramidal or the essentially psychic cells of the brain, with consequent loss of their function and with marked intellectual degradation when they are affected. The higher will power is impaired, the will loses its grip, normal inhibition is removed, so that the person is easily tempted to other forms of indulgences, and we know that the great campaign of the National Council for combating Venereal Diseases cannot afford to disregard the connection between alcohol and the social evil. I have seen young officers, barely 20 years of age, whose army career has been ruined by drink and debauchery. The disposition in those who drink to excess changes into querulousness and impulsiveness; in fact, the most marked mental effect of excessive drinking is the tendency towards the development of a hostile attitude of mind, with the consequent liability to react furiously and intolerantly. Alcohol attacks the hierarchy of the tissues, for it has a special affinity for the nervous system; there is a shedding by degrees of the most highly evolved faculties; there is a loss of prevision, an impairment of the judgment and a failure in the power of discrimination; later on, the memory becomes affected and no amount of reasoning is able to persuade the person who has got into the habit of drinking to give it up, even if it be clearly pointed out to him that he and his family dependent upon him are being pauperized by it.

It is always very difficult to estimate the exact etiology even in the most common diseases, but it is impossible to arrive at accurate conclusions in regard to the causation of mental diseases; yet, in connection with alcohol, the Lunacy Commissioners in their Report for 1905 made the precise and definite statement that alcohol in their opinion was a "brain poison." Whether it be justifiable to describe as a deleterious poison an organic substance useless to the individual under ordinary conditions of health, may be a matter for legitimate differences of opinion, but the Lunacy Commissioners made in addition the further statement that although some counties with a comparatively low rate of insanity had a high proportion of cases with a history of intemperance admitted into asylums, there were other counties with a high rate of insanity but with a low proportion of cases suffering from alcoholic intemperance; nevertheless, in those areas in which there was an association of intemperance and insanity, there was also the definite association of intemperance and crime, which appears to justify the inference that in those areas where there may be a high incidence of intemperance, there will also be a high proportion of insanity and crime—it is the considered conclusion from the definite observation of all social workers that where there is intemperance there also are crime and insanity. It is interesting to note that when statistics as to the causation of insanity are taken over a series of years, the number of cases appearing as caused by alcohol as well as by other causes show but little variation from year to year, and it is computed that alcoholic intemperance may correctly and without any doubt be attributed as the assigned cause of insanity in no less than 20 per cent of all males admitted into asylums and in no less than 10 per cent of all the females; and when the total number of admissions for the last year of which we have record, viz., 1915, was quoted as 8600 males and 10,000 females, we can readily see that alcohol was in one year responsible for over 2700 cases of mental disease in England and Wales, *i. e.*, of persons who had to be compulsorily detained against their will and who in consequence of drink were deprived of their social, civil, domestic and financial rights, and of whom it may be observed a number will continue under detention for the remainder of their lives. It may be surmised that about 3000 persons every year become insane through drink in England and Wales.

I have referred to the difficulty there is in arriving at the exact factor of causation in mental diseases, and as may well be appreciated in this illness, the patient himself is unable to assist the investigator, as, owing to the clouding of his reason, the statements he makes are unreliable, and further, the information vouchsafed by the friends does not help to elucidate the cause, for the reason that they only relate such antecedents in the history as appear to them to bear upon the illness, which are rarely either accurate or full. Moreover, in many instances the cause attributed by the friends only stands in some immediate relation to the illness and forms no true part of the cause; indeed, it often has little or no connection with it, the real factor being some inherited or acquired frailty or some weakness in the nervous co-ordination which the friends have either minimized or overlooked or have carefully attempted to suppress. So often is this the case, owing to the stigma attaching to mental disease, that a studious effort is made by all the relations to lessen the importance of a faulty family history and to give prominence to trivial and unrelated factors having no definite causative effect. From what I may claim to be an extensive personal experience, I am more than ever convinced that in mental disease there exists some *locus, resistentiæ minoris* in the brain tissue, which renders the individual more prone to be affected by circumstances which in the healthy person would have less influence; and although several antecedents may combine in the ultimate production of a mental breakdown, it is logical to assume that any one of several causes may be the immediate agent responsible for the final breakdown. In regard to this, much depends upon the so-called "immunity" or the individual resistance shown by the person affected, and as we know when several persons are exposed continuously to the same infectious fevers, some always escape and do not contract the infection, whilst others appear to take the disease repeatedly and to suffer in turns from almost all the other ills to which flesh is heir. No fact in biology is more striking than the difference in susceptibility to disease conditions exhibited by different persons and different races, or even by different animals. It accounts for the very different symptoms produced by the same dose of the same kind of alcohol upon different persons. We know from medical experience how, in regard to drink, some persons may break down from arteriosclerosis, hæmorrhage, and cerebral softening; whilst others may

suffer from infiltration of the glandular structures, *e. g.*, the liver or kidneys; whilst others again rarely suffer from nervous or mental lesions at all, but they break down from more gross tissue changes and become physical rather than mental cripples. Drink in small doses is literally death to some persons, whereas others tolerate it in large quantities, and the brain worker rather than the manual laborer shows the least resistance to it. As we know, one person may become morbidly irritable and quarrelsome, another may be ludicrously affectionate, a third stupid, a fourth vain and boastful, and a fifth silly; all these differences denoting differences of susceptibility to the same dose of the same kind of alcohol. The same susceptibility to alcohol and to disease that is seen in persons is also exhibited in the history of races, *e. g.*, the native races in many parts of the world are comparatively insusceptible to yellow fever, to enteric and to malaria; and we know the same condition to exist in animals, for dogs and goats are rarely tubercular, and rats which are not susceptible to anthrax are only so after fatigue or when fed upon an exclusively vegetable diet, which helps to render the blood alkaline, a reaction which favors the growth of the bacillus; we know again that tetanus, for instance, is never met with in fowls. These facts demonstrate that there is a natural immunity or a natural insusceptibility on the part of certain races, individuals and animals to certain diseases which may in the same persons even vary at different ages, *e. g.*, as age advances, the immunity to diphtheria and to scarlet fever becomes more marked and definite, and this immunity may be either partial or complete. Precisely the same sort of immunity or insusceptibility which occurs in disease is met with in the use of alcohol, and we are therefore unable to foretell the particular group of neurons likely to suffer in any special case of alcoholic indulgence; nor can we foretell the progress of the symptoms when a group of neurons has been attacked. All we can assert is that for every individual there is a spot or place of weakest resistance which has been arranged for him through natural selection and heredity. For long periods of time, many of the different races have been exposed to alcohol, but the susceptible ones have been weeded out, whilst the survivors transmit their insusceptibility to their descendants, and although this is an observed fact, yet it gives us no physiological explanation of the greater immunity of the insusceptible ones. It is possible

that more proteolytic enzymes are produced by the organs of one individual than by those of another in order to destroy or to modify such a toxin as alcohol, with the result that a greater immunity exists in one person than in another. Whether the explanation of this phenomenon be afforded by the *humoral* hypothesis, which ascribes immunity to the action of certain substances existing in or generated by the body fluids, or the explanation be afforded by the *cellular* theory of the more active phagocytic action of the polymorphonuclear leucocytes, or to the *cellulo-humoral* theory of the production of alexins or bacteriolysins in the blood cannot now be discussed; but it is a well ascertained and an incontrovertible fact that alcohol acts differently upon different persons, and this personal equation of the individual should be taken into consideration not only when discussing the symptoms of alcohol, but also when urging legislation for the control of its sale. I have mentioned the subject of immunity in order to show that whilst alcohol may be regarded as a poison—and clearly in this particular what is one man's meat is another man's poison—yet, like many other poisons, it can under certain circumstances be of distinct service to mankind. I may say that I believe the consensus of opinion among medical men in the present day is that in many instances the use of alcohol is to some extent beneficial; but there is a strong section of the thinking public which realizes that alcohol is a lethal weapon which can work the most fell and deadly effects, and that its general use therefore needs the most careful and earnest control. We know personally in too many instances brought to our notice that alcohol reduces energy, lowers vigor, diminishes initiative and paralyzes enterprise, and therefore many persons abstain from it altogether, and they use untiring efforts to prohibit its use by others and this through the highest motives; but it must not be forgotten that total prohibition breeds vices in regard to drugs, sedatives and anodynes. At the moment, the public feeling generally is, that under the control of the normal reasoning and moral faculties the moderate demands of working men and women should be satisfied, i. e., within strict limitations, which is interpreted to apply to its use at meals only and only by those who find it helpful in their daily work. It is often felt by those who watch events that the logic of facts has to be carefully weighed against the sentiment of an ideal, and if true progress in regard to temperance is to be

encouraged, the watchword must be *festina lente*. However excellent the motives, however firm the zeal and unwavering the devotion, progress cannot be forced, and it cannot be pushed far in advance of public opinion. I know, in regard to the control of the liquor traffic, that both feeling and sentiment have run high and with regrettable consequences. It is necessary in regard to this aspect of the question to take cognizance of the state of feeling in all classes of the people, and at the moment there seems to be an irresistible popular feeling against the complete prohibition of alcoholic drink, which that great and useful movement, the "War-time Prohibition" or the "Strength of Britain movement," has already had to experience; nevertheless, it has achieved much useful success in its educational campaign, for it has drawn special attention to a social problem that has been too largely ignored. In discussing this problem, various aspects of the drink question come under review, and the hygienic, medical, sociological and ethical aspects all come up for consideration.

In this paper I propose to deal exclusively with the mental symptoms, viz., those that result from the influence of alcohol upon the nervous system, and in discussing this aspect it may be appropriate to state that there is evidence that every psychological state has a corresponding physical state in the brain, for to every physical process there are special physical and chemical changes in the nervous substance corresponding to them, hence the maxim, "To every psychosis there is an appropriate neurosis," which means that every mental act has its appropriate physical correlation. This parallel relationship has been proved both by observation and experiment; it is a joint conclusion of psychology and physiology, and can be definitely supported by clinical and pathological research. Different parts of the brain, as we know, subserve different physiological functions; thus, one part is concerned with vision, one with sensation, and another with bodily movements and speech; yet the whole brain acts together, so that when these various parts are affected by alcohol there occur visual and sensory illusions upon which are based delusions. In consequence of affections of touch there arise mistaken ideas and complaints about electricity, machinery, hot irons, or the gnawing lacerations of wild animals. It is these sensory disturbances which so often originate delusions of persecution and the violent and impulsive

retaliations so often associated with drink. There is no better ascertained fact in medicine than that alcohol has a peculiar affinity for that part of the brain which is connected with the "muscular sense." It destroys the co-ordination of the fine sense which interprets the equilibrium of the upright position and that of the limbs, and as we see in drunkenness it may bring about motor paralysis. Even before ordinary sensation is affected, the muscular sense may be attacked; so that engineers, delicate instrument makers, mechanics, typewriters, pianists, draughtsmen and those who do fine work need to be especially on guard if their educated and delicate muscular sense is to be preserved to them. It is our fine perceptions that give us the experience upon which we act, and two of our perceptions especially, viz., sight and touch, have been very fully studied experimentally, and these are the ones mostly affected by alcohol. In regard to touch, a composite sensation, we know there are four distinct external receiving organs in the skin: Firstly, that giving the measure of pure touch ascertained by the pressure on the skin of fine hairs mounted in wooden handles and attached to a balance; secondly, the pain spots indicated by pressing with metallic points; thirdly, heat spots, and fourthly, cold spots indicated by hot or cold blunt rods. In every instance is the response to these varied by alcohol; the first to go is pain, the next heat and cold and the last pure touch. These are facts that can be demonstrated by experiment and are the same as occur when the nerve to the skin is divided. In speaking of the mind as related to the brain, we realize that its study implies a close investigation of the various senses which are the avenues leading into the mind. Formerly the study of the mind was limited to the field of introspection only; but of late years investigation has been carried into mental phenomena by means of experiments, and these have enabled us to examine our sense perceptions with much more accuracy and precision both under normal conditions and under the influence of graduated doses of alcohol. It is usual to speak of the mind as composed of three types of conscious activities, viz., cognition, or the state of knowing, of feeling and sensation, and lastly of the will, the two latter being now grouped in the subdivision of interest; but the will is the highest and essentially the most human characteristic of the mind. Of the powers of the mind, the memory is one of the most fundamental as well as the

most important, for without memory we should be unable to co-ordinate the different states of consciousness and we should also lose our personality, results which we see occurring after the excessive use of alcohol. The facts which come into the mind to be grouped together by association—like to like and unlike contrasted with unlike—remain endorsed upon it through memory, and the main facts in education are to form time-saving and correct associations. Discipline is a matter of association—a body of well-trained troops only needs to hear the first of a series of orders to carry out the whole train, as one is linked to the next by association. The power of constructing and carrying out trains of thought by association is described as the power of apperception, which is the focussing power of the mind, and it is the attention which is the first to be impaired by alcohol. It may be temporarily suspended or it may be permanently destroyed.

There has been much confusion as to the use of terms in dealing with the effects of alcohol, and the term alcoholism has received widely different meanings. Mr. Leif Jones (president of the United Kingdom Alliance), in an address to the International Congress at the Hague in 1911, used it as signifying the total consumption of alcohol by a people; whereas others use it to imply the measure of the mortality from strong drink indicated by mental and physical symptoms leading to fatal results and recorded in the registrar-general's statistics. The most common effect of the excessive use of alcohol is drunkenness, and the symptoms of this are too well-known to need description. But there are three very different types of drunkenness: Firstly, there is the periodic drinker or the dipsomaniac who imbibes freely and deeply, but at intervals only, and during these intervals he may abstain completely; secondly, there is the person who literally sops in alcohol, who is hardly ever sober and is the person described as the "habitual drunkard," who swells the police court lists until, eventually, owing to the progressive lesions and their lasting effects, his death is recorded in the registrar-general's statistics as a case of alcoholism; and thirdly, there is the ordinary drunkard who drinks from pure conviviality and only needs the congenial pals to spend all or most of his money whenever he gets it, and thus to lower his productive efficiency. He is the typical Saturday-night and Sunday drinker, and he almost invariably gets into the hands of the police

and figures in their statistics. It is this person who is the average worker upon whom the state depends. Broadly speaking, neither of these terms signifies the amount of alcohol consumed, although the statistics of drunkenness may be the most reliable index. As we know, there may be a considerable consumption of alcohol with a comparative absence of drunkenness, and for this reason it would be more convenient to regard alcoholism as a social disease of which drunkenness—whether of the periodic, the chronic or the occasional kind—is one of its forms. If drunkenness may be taken as an index of the amount of drink consumed, the number of deaths from cirrhosis, delirium tremens, dropsy or Bright's disease may be taken as an index of the incidence of the social disease. It has been asserted by some critics that a diminution in the number of cases of drunkenness may imply even more rather than less drinking, because those persons who, under the present restrictions have a difficulty in obtaining alcohol, may drink privately and secretly in their own homes; but this is denied by all social workers and is contrary to the observed experience and the recorded inferences of all those who know the homes of the people. Whatever importance or value we give to these terms, it must be the question of immunity or the insusceptibility or the vulnerability of the different organs of the body which is the determining factor as to whether a person comes under the definition of drunkenness or habitual drunkard or of alcoholism. We employ the latter term to signify all the pathological changes which result from alcohol and to include all the varying symptoms, whether mental or physical, and whether these occur in hospitals, asylums, police courts or the private home of the individual. Alcoholism must be the total effects of the use of alcohol, of which drunkenness is probably the most convenient if superficial indication, and it is drunkenness in one of its many forms—sensory, motor, mental or moral—which is the most common indication of excess.

Of the various forms of mental impairment caused by alcohol, the most dangerous because the most violent and impulsive is *delirium tremens*, which occurs in consequence of continuous alcoholic intoxication in those persons who are liable to mental and sensory hyperæsthesia, and is associated with extreme agitation, tremors, night hallucinations and insomnia. The symptoms are too familiar to be further detailed, but probably thousands of

these occur annually. Another form of mental affection not uncommon among the civil population, although fortunately rare among the military, is that of multiple neuritis associated with mental symptoms and commonly called Korsakoff's psychosis. It is characterized by a loss of memory of a peculiar kind. There are gaps in the recollection of past events, which the person fills up with events that have never happened; these being suggested by some trifling incident in the environment at the moment, and for this reason he is said to lie shamefacedly, but this is only because the memory is a blank and he is unable to retain impressions of his own statements, causing a peculiar forgetfulness as to time and place and a loss of orientation. There is an impairment of that special adhesive quality of the nerve cells by which the healthy brain is able to retain the images of past sensations and by means of which thoughts are retained in a clear, regular and logical order. This form of loss of memory is described as *paramnesia* and is most indicative of alcoholic indulgence. A third form of mental affection through drink is one closely related to epilepsy and this is greatly favored by a head injury or some predisposition to mental disease. It is accompanied with sudden frenzy and fury and is not infrequently associated with unconsciousness, and possibly also epileptic convulsions; but if these are absent there is a marked "automatism" and a complete forgetfulness of what has previously occurred. In these attacks the person may commit acts of serious violence, even suicide or homicide, and there is an imagined hostility to his environment which calls for resistance or retaliation; but this condition ceases entirely with abstention from alcohol, although an immediate relapse may occur when excessive drinking is again resumed, and it may be noted that this excess may be a very small amount of alcohol, as in these persons there is a marked susceptibility to its effects. I have met these cases repeatedly in civil practice and also in the case of young officers who have suffered from head injuries. A fourth form of mental affection is an unrestrained excitement caused by the presence of vivid hallucinations, and again it is the susceptible brain that suffers rather than the normal person, for very little alcohol may produce these delusions which are vivid and terrifying. The hallucinations may induce a chronic delusional state from which there is no recovery, and this condition much resembles that of

paranoia, with delusions of suspicion and persecution. It is essentially a chronic form. Lastly, there is the state of terminal dementia, in which the mind gradually fails until the mental wreckage is complete. Whether a case evolves from slight mental confusion through the different mental states into fatuity and dementia as the result of alcohol, must depend more upon what has already been referred to as the peculiar susceptibility of each individual rather than upon the quantity or the quality of the alcohol imbibed. It is certain that all young persons in health are better and fitter without it, as also all older persons with a neurotic family history.

It may be correctly stated that there is much in common between all the forms of mental disorder associated with alcohol; there is an undue suspicion in all against their environment and if delusions are present they tend to be of a persecutory nature; even if they partake of a grandiose character, there is frequently the suspicion that the victims have been robbed of their rank, position and wealth. Their hallucinations mostly relate to sight and touch; imaginary objects are seen moving, crawling or creeping over them, and they complain of being burnt, electrified or tortured; the memory is invariably affected for recent events, although more correct for remote events, and their actions are predominantly impulsive, purposeless and unreflective; they make imaginary journeys and relate what seem to be plausible assaults committed upon them, which they resent and which they intend to repay their fancied enemies with interest; lastly, there is the invariable moral and intellectual deterioration shown by the offences committed against public decency and against the amenities and conventions formerly so correctly observed, so that the alcoholic ends by becoming an object of reproach to all his former friends and associates.

I have already referred to the impulsive and dangerous acts committed by persons under the influence of alcohol. In some instances these resemble the uncontrollable fury of epileptic mania, which in my opinion is the most furious and savage violence that can be seen in any individual, for it seems like a tornado of wild, impetuous, destructive violence. Under the influence of alcohol the most rancorous and loathsome cruelties have been perpetrated upon innocent victims; the most bitter hatred has been shown; prudence and moderation and altruism have disappeared under its

influence. We have it officially recorded that the most brutal excesses followed in the track of the drunken German troops in Belgium and in northern France, after they had emptied the cellars of the French châteaux they ransacked the furniture and priceless contents, and then lay upon the floors in stuporous semiconsciousness; whilst at Rheims they behaved with ferocious cruelty, and in the dug-outs of the Somme battle our men found German officers helplessly drunk and filthy. The account of eight drunken German soldiers returning from Malines is authoritatively quoted and relates that when a little child ran out into the street as these drunken Huns passed by she was bayoneted by one of their number, slung up and thus carried away whilst his comrades sang. The organized cruelties carried out by gangs of drunken German soldiers, the assaults committed upon helpless women and children, are an eternal disgrace to the military forces of Germany and those in authority over them. The German medals struck to commemorate the foul murder of the helpless passengers on board the *Lusitania* will forever remain a shame and a reproach to German honor. I have personally witnessed the mental breakdown of innocent women from Flanders who were driven into madness by the coarse savagery of German officers and men, whose animal nature was set loose and whose instincts and brutal desires through drink were no longer inhibited by the control of the higher faculties.

I have already referred to the use of alcoholic liquor as an ordinary article of diet, and I consider it a dangerous temptation to the younger officers. The following extract from the letter of a young officer supports my view. It is written from a divisional headquarters, "Somewhere in France," and it runs as follows: . . . "It is very hard for the teetotaller out here, as it is not safe to drink the water unless it has chloride of lime in it, and this makes it taste simply foul. I am at present drinking very light French beer, which is much better for me than whiskey. I am afraid the present way of keeping the mess bill will not work, as they order cases of whiskey and port and the cost is shared by all members whether they drink it or not." This is a matter that needs the urgent attention of the authorities, for there is no reason to penalize the abstainer to save the pockets of those who are not. Abstinence, like the custom of drinking, is a habit, and it is imperative that young men who are ready to make the extreme sacrifice for their country should not be sacrificed on the road which is not

the road to victory but the short cut to all the other vices. Quite different in my opinion is the use of the "rum ration" in the trenches. I have spoken to army chaplains about this matter; some of these are life abstainers and have served in the front trenches; these men speak of the value of medicinal doses of alcohol against cold and wet and exposure, but one and all condemn the *estaminets* where the men are served with mixed poisons with special intoxicants of their own, yet all are labelled with the indefinite name, alcohol. The chaplains are naturally in favor of the dry canteens, which many of them manage, but most of them are in favor of permitting light wines, beer and spirits during meals, if only the *estaminets* could be considered by the commanding officers to be "out of bounds," and some of the chaplains are ready to buy and sell drink at the canteens for the sake of the men, if their use is limited to meal times and the *estaminets* are forbidden. That this matter is a most difficult one will at once be acknowledged, and that there are different views in regard to it is also natural. The two letters which appeared in the *Times* on December 17 last, show this to be the case and also show the different mental states from which the critics view the present condition of things in regard to alcohol. One of the letters is from Dr. Grenfell of Labrador, who is well known to members of this society. He states that the American soldiers show an absolute freedom from drunkenness and a small amount of immorality, but when they get to England and France "they will get all the alcohol they want and therefore also the danger that comes with it." In the same number of the *Times*, Mr. W. T. Ellis writes that he has just arrived in London from Russia and his own impression after four days of observation was in striking contrast to the suggestion of Dr. Grenfell, a strong prohibitionist. Mr. Ellis writes, "I have yet to see a drunken soldier here, or one behaving in any way that reflects discredit upon the Allied flags." To the man in the street the real truth must lie between these two extremities, and it is interesting to reflect upon the mental state of the critics themselves. I may add that during the whole of Christmas week whilst going about freely in London I did not meet a single drunken person. As to the effects of alcohol upon the mind we may repeat: Firstly, that there are the various degrees of mental confusion and motor inco-ordination described as drunkenness, which are mainly of three types, viz., the periodic kind, shown in the dipsomaniac, the more

or less continuous form seen in the habitual drunkard and the occasional; secondly, the state described as *delirium tremens*; thirdly, the combined condition of neuritis and psychosis; fourthly, the convulsive and automatic state; fifthly, that of chronic hallucinations and delusions, and, lastly, the terminal state of fatuity and dementia. It may be stated broadly that all forms of mental affections brought on by alcohol or associated with it may be subdivided or referred to one or other of these groups.

Let me now take the second section of my theme and briefly refer to the mental states shown by those responsible for the sale and control of alcoholic drink, which have ranged between a mild endurance and extreme intolerance, and, as we know, the question of drink is by no means a new one in this country; indeed, drunkenness as the consequence of drinking is the oldest of the vices and has been known in every country from very ancient times, whereas alcoholism or the pathological conditions produced by alcohol is a development of civilization.

The statutory licensing of ale-houses began as far back as 1495, but it was not until 1606—to use the words of the act—that “the loathsome and odious sin of drunkenness was made a statutory offence punishable by fine or confinement in the stocks.” Throughout the Middle Ages the provincial and the diocesan ecclesiastical courts exercised an active and strict jurisdiction in regard to moral correction, and sternly punished the “infamous and offensive” sin of drunkenness. Apart from special local legislation the early statutes of 1606 continued until 1872, when the Licensing Act of that year made it an offence punishable on summons by fine to be found drunk in any public place or on any licensed premises. There was more activity in regard to drink legislation during the '70's than in any consecutive ten years before or after, and not until the Licensing Act which came into force on January 1, 1903—as a result of a special Royal Commission described as the Peel Commission—was there any concerted effort made to diminish the number of public houses proportionately to the population. This act made it a penal offence for a person to be drunk and incapable on any licensed premises or in any public place, and a drunken person if in charge of a child under seven years of age became liable to imprisonment with hard labor for the period of one month, and information in respect of

this offence and even the arrest itself may be made by any person. A special feature of this act was the "black list"—a system by which the offender if convicted for drunkenness four times in the same year may be either fined or sent compulsorily into a reformatory for any period up to three years. The police provide photographs of the offender (with details of previous convictions) to all licensed premises and to all secretaries of clubs within the district of the court, and if drink is afterwards supplied heavy fines may be imposed upon those who sell. This act aimed at protecting the home and it *tended* to make it impossible for drunkenness to become the curse and ruin of an innocent family, and in addition the act gives power to control the structural arrangements of all public houses, so that no alteration is possible without the consent of the licensing justices. The act was an effort to repress the abuse of alcohol rather than to restrict the sober person; yet, since the passing of the act and for several years up to 1914, there has been a gradual rise in convictions for drunkenness of both males and females; the "black list" also in spite of good intentions has become a dead letter, so that although there has been a steady diminution and reduction of public houses, partly by order of the licensing justices and partly also by arrangement with the brewers, it was not an infrequent occurrence for county councils and other authorities as well as for local residents to petition the licensing justices to diminish the number of public houses on the grounds that facilities to obtain drink not only increased the temptation for people to drink but also encouraged the desire; the petitioners felt deeply that the class of the very poor should not be swelled with continual recruits through drunkards and their families being brought into them from all the other classes. Indeed so serious had matters become six months after the war through drunkenness, impairment of health, loss of workmen's time and general bad temper where a large population had congregated for munitions and other government work, that the present prime minister described the drink as a worse enemy than the submarine, and in June, 1915, the Liquor Traffic Control Board (with Lord D'Abernon as Chairman and Mr. J. C. G. Sykes as Secretary) was instituted by the Parliament of the people under the Defence of the Realm Act, and it must not be forgotten that the enactments and regulations of this Board have the force of an Act of Parlia-

ment. This Board set to work at once with a definite policy, which was to stop continuous drinking and modify drinking at frequent intervals, especially during working hours, as these indulgences were believed to be the root of most of the physical and mental troubles and disabilities among workers, and the Board hoped to discourage all drinking except at meals. The work carried out by the Board in such areas as Carlisle and Enfield reads like a romance, but it would have been probably impossible if Parliament had gone to the country asking for the powers they have exercised. In Carlisle the Board have closed many of the public houses and some of the breweries, and have themselves taken over the enterprises carried on formerly by these as well as the wine merchants. They have placed disinterested managers in charge of their houses, and managers were not to profit by the sale of drink, but only by the sale of food; the hours of opening were restricted to those of meal time, the sale of spirits was to be discouraged and none was to be issued to those under 18 years of age; and a very important feature, all drinks were permitted to be diluted. They have arranged for entertainment and recreation to be provided for persons frequenting their premises. They also have power to provide postal and banking facilities for their customers. Moreover, they have arranged for their own inspectors to visit and examine all premises and clubs within their controlled areas in order to insist that the regulations were carried out, and lastly they have established Sunday closing. It is not fully appreciated by the public to what extent the regulations of the Board have succeeded, but it is only short of marvellous to realize that these control 38,000,000 of the population of this country, and it may be surprising also to know that the Board have not acted in a single instance without an application to do so being presented by the local naval, military, transport or munition authority. May we ask with what results the Board have acted? Throughout London and in 40 towns with over 100,000 inhabitants, 159,000 convictions for drunkenness in both sexes occurred before the war, whereas in 1916 these had diminished to 77,000, or less than one-half. In London alone last year nearly 20,000 arrests were made by the police for drunkenness, with "incapability" and disorderliness as qualifications, and this number is less than half the number during the first year of the war. In all the areas where the Board have exercised their powers,

the streets have become more decorous, the station platforms more orderly, the people more tranquil and crowds less excitable; workers have been healthier and their minds less irritable; there has been more contentment among the mass of the people—they are more reasonable and have got through more work. In addition, there has been a reduction by one-half in the number of cases of *delirium tremens*, especially in places like Woolwich where men collected in large numbers and many of them drifted through drink into the Poor Law Infirmaries. The results in all areas have been perfectly astonishing, although these are only a few of the attainments of the Board, and these results have been testified to by chief constables, medical officers of health, district workers, nurses, and even by members of the licensing trade itself. The police court statistics have supported the statement made that drunkenness among men and women has diminished by one-half. Yet what do we find among some of the critics, viz., those who are described as extreme temperance advocates; persons whose wholehearted efforts are said to be in the public interest, yet who in regard to the control of the liquor traffic are "neck or nothing"? They offer to the policy of the Board an uncompromising opposition, and in place of the scheme of purchase and control so successfully carried out by the Board they advocate a scheme of total prohibition. They offer a flat contradiction to the Board's statistics, and to support their opposition they urge that in spite of the restrictions generally imposed by the Board the fact that there has been a continuous increase since the war of expenditure on intoxicants—which was 12 per cent higher in 1916 than in 1915, and 24 per cent higher than in 1914—and that the amount of money spent upon alcoholic liquor in 1916 was higher than in any previously recorded year and the highest yet recorded; still this can be accounted for by the high price paid for drink, which means that although the nation spent more it drunk less and the revenue received less money. These opponents also assert that if there has been a diminution of drunkenness, which is not admitted by them, there has been more private drinking, which is denied by all those most competent to judge. What are we to think of mental states that can direct such a virulent and vehement crusade against the work of the Board of Liquor Control? The following is the criticism made in the leading article of the *Times* of December 26, 1917: "The

diminution of intemperance among women will not be welcomed by those intemperate advocates of temperance who regard the total prohibition of the liquor traffic as an absolute good in itself. Some people seem actually to prefer an increase to a diminution of drunkenness, because it is a lever for promoting their cause, and they will criticize and deny the evidence quoted in the report to the Board, viz., the fact that there has been a diminution of drunkenness as shown by the average weekly number of convictions—which has fallen from 700 in 1914 to 239 in 1917. These specious critics assert that police statistics are notoriously unreliable and that the fall in these has been more than overbalanced by an increased home drunkenness, that public excesses have been replaced by secret drinking," which, of course, is not the case. The local *Carlisle Journal's* reply to this criticism reads as follows: "The improvement (in Carlisle) is as noticeable in the orderliness of the streets as in the official figures of decrease in convictions for drunkenness and to the citizens this return to good order must be highly gratifying, and not only are the numbers decreasing in comparison with previous years, but the improvement still continues and is very pronounced." Nor has this hostility been limited to the work of the Board; one member of the Board himself has been the recipient of the most unmerited abuse and contempt on the part of this extreme wing of the temperance party. Nor was it long before their example was taken up by other discontents. The Labor Council in Carlisle saw in Sunday-closing an interference with the workmen's comfort and freedom, and they naturally demanded a reconsideration of this matter by the Central Board with a request to return to the former hours of opening. The whole matter was referred to the Local Advisory Board, which apparently took the side of the Labor Council, but the Central Board very wisely decided there was not sufficient reason to go back upon their decision, suggesting that whatever determination was arrived at would always find some conflict of opinion either for or against. The matter is possibly not yet closed, because the Labor Council have decided to make further representations, and it is earnestly hoped that the trouble started by the extreme wing of the temperance party will not be the means of stirring up labor troubles in Carlisle. In addition to the complaints of the Labor Council, there has arisen an acute opposition

from the Midlands and again on behalf of the Prohibitionists, but apparently originating in an insignificant quarter.

It is quite well known that before the Central Board came into being, the policy of regulation and restriction under private ownership had already received a fair trial throughout the country, but it is also equally well known that it had reached its effective limits and something practical and immediate had to be done. No one denies that to the idealist temperance reformer—may we say not only to the mind of the total abstainer—prohibition as an ideal has undoubted public advantages over any system of state purchase, precisely as this has merits that are immeasurably superior to the scheme of the Improved Public House, as it is called, advocated by the self-denominated True Temperance Association; but the work of the Central Liquor Traffic Control Board has by an overwhelming consensus of public opinion advanced the cause of temperance, yet there has been this incomprehensible attitude against its members and against its work, and more incomprehensible still, this attitude has been excited and fomented by those who should be its best friends. What is the psychological explanation of such opposition? I am of opinion that this intolerant exhibition of superiority deliberately shown by this extreme section is based upon egoism; it is a consequence of self-gratulation and self-esteem which borders upon an obsession and is regarded by some authorities as pathological. Most of us will acknowledge that all excellences require some comparison to demonstrate their advantages, but when specious reasons are advanced to support them and these are mingled with personal attacks, then such criticism passes beyond the limits of legitimate argument. A person who argues from selfish ends and from a feeling of personal superiority over others is very apt to dry up the wells of truth in order to justify his standpoint. Nor is such a person contented to stand alone, but, as we see in this instance, he courts the sympathy of others—whoever they may be—and so long as his own views are furthered, he will even sacrifice his own sense of honor in his effort to bring the opinion of society against this opponent and to throw discredit upon his views. No form of hostile criticism is so unendurable to a sensitive high-spirited nature as the disapprobation of his fellowmen and fellow workers, and it is a favorite device with the advocate of a weak cause that he should not only excite

public opinion against his opponent, but also that he should heap upon him as much private contempt as possible, with the sole object of forcing him through this vituperation and scorn to modify his attitude, and this irrespective of the public good. We have used strong words in criticizing this conduct of the extremists and we know that this virulent and vehement opposition is not supported by public opinion. Let us be thankful that in the best interests of this country we have had a strong and energetic committee that has created a great change in the habits of the people as a war-time measure. It behoves us to think of what is to happen after the war is over. The period of demobilization is going to be a serious trial, especially to us who have to bring our brave men home from far distant seats of war, and all our men will be returning to find things very different from what they were. As Major Eccles said, "Scenes of drunkenness will be a dishonor to a nation that has been fighting for right and righteousness." It is the duty of this society to urge that the best conditions for employment shall be provided for our damaged men. There will be many difficulties after the war; there may be destitution; there certainly will be shortage of food and money. The question of the control of drink must be one of the first considerations, and are we giving it the amount of thought it needs? Our present mental attitude is too apathetic, and if we do not awaken now we shall be confronted with far greater menaces than we have hitherto faced; at any rate we can rely upon the standing example of what has been achieved by this Board even during the stress of war.

HISTORICAL PATHOLOGY: THE CASE OF KING LOUIS XI OF FRANCE.

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The idea that disease has played an influential part in shaping the general course of history contains no novelty. Epidemics of all times have been the object of scientific investigation, and their political, social, and economic influence has been definitely weighed. The black death in England, malaria and the decline of Greek civilization, small-pox, cholera, and yellow fever, occur at once to the mind as examples of diseases which have been undeniable factors in history. Many of these have been studied with painstaking thoroughness. Yet, however true this may be of epidemics affecting masses of people, it is not true of individual cases. There is scant reason why it should be. The diseases of individuals, of rulers, let us say, certainly have little historical significance excepting in so far as they bear upon the mental integrity of the sufferer. As a matter of fact, only recently has very much attention been given to the historical value of mental pathology, and to the abnormal conduct of historical persons which has been so frequently the result of their bodily afflictions.¹ This factor is, nevertheless, of definite historical importance.

It is the purpose of this paper, therefore, to raise the question, first, whether the historian should not devote to the study of historical pathology his serious attention; and, second, to attempt to show from examples, especially the example of Louis XI, the desirability of its employment in the study of medieval biography.

At the outset Bernheim's indorsement inspires confidence in the soundness of this method of investigation. He says:

A theoretical knowledge of mental troubles is quite indispensable to an understanding of the numerous phenomena of character and of numerous actions; I do not speak of the Cæsarean madness, now become a commonplace, but of the phenomena which recur so frequently in the biographies of

¹ Ueber den Einfluss acuter Krankheiten auf die Entstehung von Geisteskrankheiten, von Dr. Emil Kraepelin, *Archiv für Psychiatrie*, Vol. XI, XII.

historical persons, such as religious exaltation which passes over into hallucination and fixed ideas. . . . Here the realms of psychology and psychiatry touch, and the historian cannot but profit by a study of the fundamental aspects of the latter. In what a different light, for example, would the actions and motives of the unfortunate Louis II of Bavaria be understood if they could be explained rather from the psychopathic conditions of his mental affliction than from the analogy of normal mentality. How readily the layman mistakes for genial caprice, or for fantastic extravagance, what the alienist recognizes as precursors, or symptoms, of mental disease.²

Viewed from this angle, the writer of biography will seek in personal eccentricities a new source of evidence, and in the manifestations of mental disease an additional field for historical investigation; since in many cases he will have to determine whether certain actions call for a pathological or a political explanation.

That the whole interpretation of a reign may turn upon just such a choice is clearly shown in the case of King Edward the Second of England. While he was upon the throne the barons took away his power; his wife left him; and England was in a condition of confusion hard to explain. When, however, it was made clear from the chroniclers that King Edward was a hereditary degenerate³ the unexplained incidents of his reign found a ready and satisfactory solution.

² "Eine theoretische Kenntnis der Seelenstörungen [ist] für das Verständnis zahlreicher Charaktererscheinungen und Handlungen geradezu unentbehrlich: Ich will hier nicht von dem zum Schlagwort gewordenen Cäsarenwahnsinn reden, sondern von den so häufig in Biographien historischer Persönlichkeiten wiederkehrenden Erscheinungen, wie die religiöse Exaltation, die sich bis zu Hallucinationen und fixen Ideen steigert, . . . Hier berührt sich die Psychologie mit der Psychiatrie, und es kann dem Historiker nur zum Vorteil gereichen, wenn er sich mit den Grundzügen der letzteren vertraut macht. Wie anders versteht man z. b. manche Handlungen und Motive des unglücklichen Königs Ludwig II von Bayern, wenn man sie im Zusammenhange mit seiner psychischen Erkrankung aus psychopathischen Bedingungen herzuleiten vermag, als wenn man sie aus den Analogieen eines normalen Seelenlebens erklären wollte! Wie leicht hält der Unkundige für geniale Laune oder phantastische Ueberschwenglichkeit, was der Kenner der Psychiatrie als Vorboten oder Symptome von Geistesstörung interpretiert!"—Bernheim, *Lehrbuch der historischen Methode und der Geschichtsphilosophie*. (Leipzig, 1903, p. 604.)

³ Was King Edward the Second a Degenerate? A consideration of his reign from that point of view. Chalfant Robinson, *American Journal of Insanity*, Vol. LXVI, No. 3.

Without any doubt the subject is difficult for the historian to approach, but too much attention cannot be directed to heredity; for the biographer must have scientific information as to the physical inheritance of his subject if his conclusions are to have any value whatever.

This statement does not overlook the obvious fact that of the two recognized dominant factors in determining character, heredity and environment, historical biography has been, in the main, concerned with the latter. Historical setting, or the political and social environment of the monarch, has generally occupied the field to the exclusion of the equally important factor of heredity. Yet in most cases of medieval royal biography, where the personality of the ruler counts for so much, the factor of heredity is of such importance that properly it may not be disregarded.

The close intermarriages in royal families will have special weight, moreover, if we bear in mind the fact that they give such force to the law of heredity as to make the ruler far more often mentally aberrant than the subject. The insanity of King Charles the Sixth of France, for example, may be traced to the fact that he was the descendant of two sons of Louis VIII, married to two sisters, and that not a single marriage for 235 years took place outside this family save one, and that the tainted inheritance converged upon Charles the Sixth.⁴

The medieval monarch was under little necessity for restraint in his personal conduct and was encouraged by his surroundings to give rein to his impulses. Due to this very lack of inhibition, indeed, his mental symptoms were often revealed to his contemporaries with perfect frankness, because their significance was not understood, and to posterity, frequently with scientific definiteness, by the chroniclers.⁵

⁴ Brachet, CXXXVII.

⁵ Higden's *Polychronicon*, VIII, p. 298. This writer shows a surprising degree of scientific accuracy in cataloging several of the essential traits of the degeneracy of King Edward the Second. He says in his description of the King: "Not caring to associate with the nobles, he clave to buffoons, singers, actors, grooms, laborers, rowers, sailors, and other mechanics; indulging in drink, readily betraying secrets, striking bystanders on light occasions, following rather the advice of some one else than his own; lavish in giving, magnificent in entertaining, voluble in speech, varied in employments, unfortunate against his enemies, harsh toward his own men . . ."

Though imagining that he was answerable for his actions to no law but his own will and responsible to God alone, the medieval prince really was governed by the rigid biological law of his being, determined for him by his ancestors.

Another science will thus claim the right to share in the results of the investigations of the historian. For, while the historian insists that it is his province to collect, analyze, and verify the recorded facts according to strict historical methods, the biologist observes that certain of these facts collected by the historian have for mental science a very special scientific significance. This he sets forth, and the historian cannot escape the duty of reinterpreting his history in the light of biology. Plainly, many of the problems in history lie between these two fields, or in both of them. For their proper solution the historian must avail himself of the biological sciences, such as the study of mental pathology, and the biologist, such as the alienist, must acquaint himself with the historical facts.

It is this double interpretation of history in the light of the historical records and of the laws of mental pathology which asks recognition for itself as a new science under the name of historical pathology.

Brachet, the eminent pupil of Littré, editor of the works of Hippocrates and founder of the science, gives the following definition: "Historical pathology is, properly speaking, the explanation by means of biological science of the data which historical texts furnish, data organized and checked according to the rules of scientific criticism, with the double aim of serving both the medical and historical sciences."^{*}

In view of this definition and what has gone before, the difficulty of handling the material is further apparent. The historian who attempts it may be compared to a lawyer who, in an intricate case, calls in his scientific experts to aid him in constructing a reasonable hypothesis for his client's past actions which shall take everything into account, and which shall contradict none of the known facts.

^{*}La pathologie historique est proprement l'explication, par la science biologique, des données que nous fournissent les textes historique, données réunies et contrôlées suivant les règles de la critique scientifique, dans le double but de servir, tantôt à la science médicale, tantôt à la science historique. Auguste Brachet, *Pathologie Mentale des Rois de France* (Paris, 1903), Introduction, XII.

The difficulties multiply as we proceed, but they are not insuperable, although it will be plain that historical pathology must demand that the investigator shall have not only a thorough knowledge of the historical facts and of the principles of historical criticism, but a knowledge, as well, of the theory and practice of medieval medicine, and that he shall be in a position to make a clinical examination of his facts before he can interpret them.

So much for its general application. What kind of problems give to it specific illustration? A few may be stated as historical examples, thus: What account have his biographers taken of the fact that when the body of Philip the Fair, of France, was examined after his death his heart was found to be "not larger," according to a contemporary, "than that of a newborn child, or a bird,"⁷ raising the question whether a man with a physiological defect of this kind could have developed the energy to accomplish the tremendous tasks with which he is credited, and perhaps confirming the estimate of his contemporary, the Bishop of Palmiers, "the King is of no account whatever; he is not a man nor a beast, but an image, and all that he can do is to stare at people."⁸

If Pope Boniface VIII suffered from senile dementia, as it seems probable he did, were not his extravagant claims for the Papacy in 1300 rather psychopathic than canonical?

If the separation of Ingeborge of Denmark from Philip Augustus, so long an unsolved mystery, resolves itself into a question of nervous disequilibrium on the King's part, consequent upon a severe illness in Palestine, should not his aversion for Ingeborge be treated as purely pathological, and the incident be interpreted in the light of that assumption?⁹

Has the fact any historical significance that Don Carlos of Spain, always neurotic, died quite insane as a result of an access of

⁷ *Cor autem dicti regis, ut dicitur, adeo erat parvum sicut est cor alicujus pueri qui hodie prodiit ex utero matris sue; ymo intellexi quod illi qui viderunt comparant illud cordi alicujus avis. La mort et les funeraillles de Philippe le Bel d'après un compte rendu à la cour marjorque. P. P. Ch. Baudon le mony (Bibl. de l'école des Chartes, LVIII, 1897, p. 12). Brachet, Pathologie Mentale, p. 454.*

⁸ *Item quod dictus Episcopus dixit quod dominus noster Rex nihil omnino valebat—quod non erat homo, nec bestia, sed imago—quod nihil omnino sciebat nisi respicere homines. Dupuy, Hist. du différend d'entre le pape Boniface VIII et Philipe le Bel (Paris, 1665), p. 653. Brachet, p. 444.*

⁹ Brachet, Pathologie Mentale, pp. 307-335.

malarial fever and not at all of poison?¹⁰ This last question must be answered in the affirmative, for the case of Don Carlos became historic in modern medical research, since it illustrates the now generally accepted hypothesis that in neurotic cases there almost invariably follows in the train of malarial or other severe fevers, frequent abnormal nervous or mental manifestations, and that these are governed not by the laws of the disease but by the neurotic inheritance of the patient; by the terrain, in other words, upon which the fever operates. Or, stated in medical terms, "The law of neurosis, in the case of post-infections of those predisposed by heredity to psychopathic conditions, is that the form of post-infection is a function, not of the nature of the infection, but of the heredity of the subject."¹¹ This law is far-reaching for historical pathology, since it means that a neurotic subject, of determined psychopathic ancestry, under normal conditions irritable, eccentric, lacking in self-control, impulsive, and precipitate in his actions, if attacked by a severe illness, like typhoid, malarial fever, grippe or pneumonia, would be quite likely to develop some of the characteristic stigmata of degeneracy: Fixed ideas, obsessions, maniacal delusions, or some one of the various phobias. These might produce changes in his character apparently quite new, and otherwise quite inexplicable.¹²

It is desirable to keep this law or hypothesis clearly in mind in considering the personality of King Louis XI of France, the next example.

In interpreting his actions, biographers of Louis XI have taken little account of these statements, cited by Brachet, made by the King's contemporaries concerning his health. "He was often sick." (N. Gilles, Fol. CXX, V.) "His maladies were indeed great and grievous to him." (Commines, Éd. Dupont, II, 270.) "He was tormented almost to death by several different and pitiable maladies." (Oliver de la Marche, *Memoires*, Éd. Beaune et d'Arbaumont, 1883-88, I, p. 180.) "Before his death he was

¹⁰ Brachet, *Path. Ment.*, *Introd.*, XIII.

¹¹ Brachet calls it one of the most precious conquests of the modern clinic in the realm of prognostic. *Path. Ment.*, pp. 291-292, where he cites the conclusive demonstration of this law by Tessier, in his *Leçons cliniques sur la grippe*.

¹² Ueber den Einfluss acuter Krankheiten auf die Entstehung von Geisteskrankheiten, von Dr. Emil Kraepelin, *Archiv für Psychiatrie*, XI, XII.

troubled with several maladies, for the purpose of healing which the physicians who had charge of the King's health had recourse to terrible and marvellous medicines." (Jean de Roye, *Chron. Scand.*, Éd. B. de Mandrot, II, p. 138.) So far from being negligible, however, the state of the King's health must form the basis of scientific inquiry. Indeed, incidents in the life of Louis XI, irritable,¹⁸ impulsive, and in many ways eccentric,¹⁹ furnish concrete illustrations of a class of questions which the political historian is at a loss to answer, but which are more or less readily and satisfactorily solved in the light of historical pathology. For example: (1) Does it have any historical significance that Louis, always concerned about his health, should send gifts, as he did, to a certain shrine in order that prayers might be offered there that it might please God to send him the quartain fever?²⁰ (2) How account for the fact that the same Louis, whose reign was replete with cruelty,²¹ who kept Cardinal Balue in a small wooden cage for 11 years, thus removing him, as he remarked, from the temptations of the world, could be so tender-hearted as to have a sick dog or a

¹⁸" . . . When he came home at night he was often weary and generally in a violent passion with some of his courtiers or huntsmen." Commines, ed. Scobel, II, p. 81.

¹⁹"He did many odd things, which made some believe his senses were impaired." Commines, II, p. 43. "In short, he behaved after so strange a manner that he was more formidable than he had ever been before." II, p. 58.

²⁰Raynal, *Hist. du Berry*, III, 132. Brachet, *Introd.*, LXXX.

²¹"The king had ordered several cruel prisons to be made; some were cages of iron and some of wood, but all were covered with iron plates, both within and without, with terrible locks, about 8 feet wide and 7 feet high. . . . He also ordered heavy and terrible fetters to be made in Germany, and particularly, a certain ring for the feet which was extremely hard to be opened, and fitted like an iron collar, with a thick weighty chain and a great globe of iron at the end, most unreasonably heavy." Commines, ed. Scobel, II, p. 75. Thomas Basin says that the days are not long enough to cite individual instances of where, without show of justice, many persons were drowned and otherwise made away with, or wasted away in the filth of the King's dungeons. "*Dies me deficiet, si casus singulos referre velim eorum quos vel in aquarum gurgitibus, vel aliis poenarum generibus, quamvis insontes, variis modis perire fecit, vel squalore carcerum macerari et constringi nullo juris et justitiae ordine observato.*" Basin, *Historiarum a Ludovico XI*, Lib. VII, p. 173. Elsewhere he compares the King's cruelty to that of the Emperor Domitian. *Hist. Lud.*, VII, 168.

rabbit carefully transported for miles in a royal two-horse chariot? (3) Or, what changed the avaricious close-fisted ruler, who always wore old clothes by preference and looked like a scarecrow,¹⁷ into a lavish spendthrift, who dressed in velvets and furs,¹⁸ paid many times the value of the things he bought, and gave away money and fine clothes without even being asked? (4) Or, what led the king, who struck down his enemies with a ruthless hand and who terrorized friend and foe alike by his masterful dealings,¹⁹ to become so apprehensive that he dismissed even the servants of his household for fear some of them might diminish or take from him his royal power.²⁰ (5) Or, how account for the fact that the affable, approachable Louis, who went everywhere and saw everyone, changed into a recluse, defended in his castle from the approach of anyone from the outside by engines of war, archers, and caltrops

¹⁷ He dressed so abominably that once he was cursed as an impostor, and was hooted and followed by a mob through the streets of a village where he was not known and had claimed to be the King. ". . . Accidit ut, eo transeunte per suburbanum oppidi, quidam eum interrogaret quando rex venire deberet; nulla enim, neque facie, neque apparatu, neque vestium ornatu vel splendore, plus quam famulus aliquis et vilis conditionis dignitatis indicia ostentabat. Cui cum rex ipse responderet quod ipsemet rex esset, statim idem qui interrogabat, movens cachinnum, in eum maledictum jecit, respondens sermone vulgari: '*Vous estes voz frères quartaines*' et cum sociis suis, qui una ad videndum regem confluxerant, eum ostenderet, dicens eis: '*Videte istum garcionem, qui regem se esse dixit*,' quotquot illud audientes erant, similis probri maledictum in eum cumulabant, sibi, tanquam ridiculo alicui ganeoni, per totius suburbani spatium illudentes et post cum acclamantes." Basin, Hist. Ludovici XI, Lib. VII, pp. 167-168 (Soc. de l'histoire de France).

¹⁸ ". . . His clothes were richer now and more magnificent than they had ever been before; his gowns were all of crimson satin, lined with rich marten's furs, of which he gave away several without being requested, for no person durst ask a favor of him, or scarce speak to him of anything." Commynes, ed. Scobel, II, p. 56.

¹⁹ "His subjects trembled before him; whatever he commanded was instantly executed without the slightest difficulty or hesitation." Commynes, ed. Scobel, II, p. 66.

²⁰ "He was afraid of nothing so much as the loss of his regal authority." Commynes, ed. Scobel, II, p. 38. ". . . For he was grown marvellously jealous of all his courtiers, and afraid they would either depose him or deprive him of some part of his authority." Ibid., II, p. 42. He was "Afraid of his own children and relatives, and changed every day those very servants whom he had brought up and advanced, . . . yet he durst not trust any of them." Ibid., II, p. 78.

scattered along the roads,²¹ and who would not be seen even through a window? (6) Louis, personally brave, who went into the very lair of his enemy at Péronne to beard him, what changed him into a cringing coward who fawned at the feet of an illiterate hermit and begged him to save his life,²² and who was so obsessed by the fear of dying that he forbade his courtiers to mention even the name of death?²³

Incidents like these are to be found in the life history of more than one of the medieval monarchs. Not generally regarded as possessing any definite historical value, they have been set down, as a rule, as interesting peculiarities only. Viewed from the standpoint of historical pathology, however, every evidence of eccentricity, it must be repeated, as well as every malady of the King has a definite scientific value.

The reign of Louis XI serves so well to illustrate further these general principles that an interpretation of his pathological history will be profitable. In the discussion which follows the writer keeps very close to the argument and citations found in Brachet's *Pathologie Mentale des Rois de France*.²⁴

The King's health throughout is the theme. Let us take for examination first the statements of two contemporary writers, Robert Gaguin and Jean Le Roye, about a seemingly trifling incident:

(i) Returned to Tours, he thought to lighten the burden of sickness by music. Wherefore he commanded that players of musical instruments of

²¹ Commynes, ed. Scobel, II, p. 76.

²² Commynes, II, p. 56.

²³ Ibid., II, p. 72.

²⁴ Dr. Brachet began in 1880 the labor of collecting material for his monumental work on the mental pathology of the Kings of France. By 1896 he had so much material, principally from manuscript sources, that he decided to publish privately what he had collected, with some brief explanations. This he did in four volumes, one being notes and comments, the other three made up of extracts from the sources. Unfortunately these were never made available to the public, and are not yet. His regrettable death prevented the completion in ordered form of his life work; but that the labor of so many years might not be lost to the world of scholarship, his widow, Mme. Anna Brachet, née Korff, arranged the notes and manuscripts as she found them, and in 1903 published the remarkable treasure-house of data for the study of historical pathology, which is known under the title of *Pathologie Mentale des Rois de France*—a scientific examination of the mental pathology of all the ascendants of Louis XI as far back as Hugh Capet.

all kinds should be summoned, of whom 120 were got together. Among these were certain shepherds, who for many days, not far from the bed-chamber of the king, played softly for the sake of comforting him, and in order that he might not fall asleep, which would make him worse. He commanded to come to Tours, besides this class of people, another quite different kind—anchorites and hermits, holy men and women, to whom he commanded that they pray God continually that, health restored to the King, he might continue to live. So eager was Louis to live longer.²⁵

(ii) At this time the King summoned a great number of players upon low and sweet instruments, whom he lodged at Saint Cosime near Tours, where they assembled to the number of 120; among them were several shepherds from Poitou, who often played before the King, but they did not see him, in order that he might enjoy these instruments and while away the time and to prevent him from falling asleep. And, on the other hand, he assembled a great number of devout men and women and holy persons such as hermits and saints to pray God without ceasing that He would grant that the King should not die and that He would permit him still to live.²⁶

These two accounts, except for the statements that the instruments were low and sweet, and that the King kept out of sight, are alike. They are all that we have from the chroniclers about the incident. Commynes, the King's official biographer, for reasons of his own, does not speak of the shepherds, and mentions only one hermit.

²⁵ "Turorum reversus, excogitavit a musica valitudinis levamen quaerere. Quamobrem accersiri mandat omnis generi musici instrumenti lusores quos centum et viginti convenisse constat. Inter quos assuerunt ovium pastores: qui multos dies non procul a regis cubiculo continenter modulabantur, ejus consolandi causa, et ne somno, quo gravabatur, succumberet. Jussit, præter hoc hominum genus, alterum longe diversum ad se convenire. Solitarii et qui eremum incolebant homines—fœminæ quoque spectatæ religionis Turorum convenerunt, quibus negocium mandatum est: Deum indesinenter orare: ut regi salute restituta maneret ipse diu superstes. Jam appetens diutissime vivendi fuit Ludovicus." Robert Gaguin, *Ann.* 1482, f. 281, ed. 1560. Brachet, p. xviii.

²⁶ "Dudit temps, le roy fist venir grant nombre et grant quantité de joueurs de bas et doulx instruments qu'il fist loger à Saint Cosme près Tours, où illec ilz se assemblerent jusques au nombre de six vingtz; entre lesquelz y vint plusieurs bergiers du pays de Poictou, qui souvent jouerent devant le logis du roy, mais ilz ne le veoyent pas, affin que ausdiz instrumens le roy y prensist plaisir et passe temps et pour le garder de dormir. Et d'ung autre costé, y fist ausy venir grant nombre de bigotz, bigottes et gens de devocion comme hermites et saintes creatures pour sans cesser prier à Dieu qu'il permist qu'il ne mourust point et qu'il le laissant encores vivre." *Journal de Jean de Roye, ou Chron. Scandaleuse*, Ed. de B. de Mandrot, II, 122, *Ann.* 1482. Brachet, XVIII.

If they are examined as material for historical pathology, the details are very suggestive. In the first place, does the intercession of the holy men and women have any particular significance? Apparently not. It was the common practice of the time, and their part may be dismissed without comment. It is quite another matter with the shepherds and their melodies, however, for here there arise, as to the therapeutic value of music and as to the class of afflictions for which it was employed, the following questions: (a) In the treatment of what disease would recourse be had to music as a tonic stimulant? (b) In what class of maladies would sleep in the daytime be prohibited as harmful? (c) In what would the tonic action of the stimulant have to be moderate and sedative? The textbooks of medieval medicine recommend musicotherapy as a familiar treatment for cases of extreme nervous disorder. Healing by means of music, indeed, is much older than the Middle Ages, as old as the Old Testament at least, for David played before Saul to soothe the monarch when the "evil spirit of the Lord was upon him," and he sought to smite David to the wall with his javelin.

Together, under one head, in the system of medieval medicine, insanity, melancholia, and epilepsy are grouped. Exhibiting the traits characteristic of psychoneuroses, they differ in species but are alike in genera.

The shepherds might certainly have been employed for a therapeutic purpose. This inference, however, to be of any value will have to be confirmed by examples from the medical practice of the time. For this purpose the following citations are interesting and more or less specific:

Bernard de Gordon, in his *Lilium Medicinæ*, Part II, Cap. XIX, *De Mania et Melancholia*, says: "The first thing to be sought in curing it is light-heartedness and rejoicing—jesting ought to be indulged in, and musical instruments; in short, everything that will cheer the mind."

"*Primum quod competit in curatione est gaudium et lætitia . . . et multa jocalia præsentare debent et ibi esse instrumenta musica et breviter omnia quæ lætificant animam.*" Bernard de Gordon, *Lilium Medicinæ*, Part II, Cap. XIX, *De Mania et Melancholia* (1363). Brachet, XXVIII. Textbooks of this kind are very hard to get hold of by the student. The writer takes this occasion to express his grateful thanks to the Surgeon General's library at Washington for the use of a copy of the *Lilium Medicinæ*.

Barthelemy L'Anglois, in his *Grant Proprietaire des Choses*, says: "This is a kind of madness which physicians call *amentia*, others call it *mania*, The treatment is to have singing and the sound of instruments of music, but in moderation."²⁸

Avicenne, in his *Canon*, calls attention to the fact that while some persons are benefited by music, others are made worse,²⁹ and the *Lilium Medicinæ* says that loud sounds often bring on attacks of epilepsy.³⁰ Both imply the moderation which modern medicine insists upon. "The tonic effect of the music should never be so great as to provoke convulsions."³¹ Hence the low and sweet instruments in Louis' case, as a clue as to why the shepherds played before the King's chamber.

In this class of afflictions, medieval medicine recommended that the sense of smell be stimulated (odorotherapy) also and for the same purpose. It is quite significant to find from manuscript sources in the Archives Nationale and from the Egerton Mss. in the British Museum records showing that from 1480 to 1482 the King's servants were scouring the country for roses and rosebuds, coquemint, sweet marjoram, and violets to keep continually fresh in the King's room.³²

²⁸ "Il est une espece de follie que les physiiciens appellent amence: et les autres l'appellent manie. . . . La medecine est faire chanter et sonner des instrumens de musique et si les doibt on faire travailler moyennement. Barthelemy L'Anglois, *Le grant proprietaire des Choses*, Trad. P. Corbichon, Lib. VI, Cap. V., Brachet, XXVIII.

²⁹ "Et quidam homines sunt, quos sanat lætitia et auditus cantilenæ, et quidam sunt quos illud augmentat." Avicenne, *Canon*, Lib. III, Tr. 4, Cap. XXIX, de cura Melancholiæ. Brachet, XXIX.

³⁰ [Epilepsia.] "Provenit etiam ex aspectu terribili, sicut est aspectus fulgaris, aut sono maximo, sicut est tonitrum, aut tympani magni et similia." *Lilium Med.*, p. 273.

³¹ Ch. Féré, *La Pathologie des Emotions*, p. 95.

³² "28 Juillet 1480. A Nicholas Mesnagier, varlet de Fourrière, 27 l. 12 s. 8 d. t.,—pour avoir envoyé deux hommes à cheval of La Mothe d'Esgry à Paris et Prouvins quérir des rozes et boutens. Où il y ont vacqué, tant à aller que retourner dix jours entiers. (Arch. Nat. kk-64, fol. 62), Brachet, XXXII. A Guillaume du Jardin, tapissier dudit siegneur, pour avoir fourny durant ledit mois de juillet et août, dudit an, de cormente et autres herbes, pour metre ès chambres et retraict dudit sieur, 2 s. 60. T. Par. Jour. Vallent 7 l. 15 s. t. (27 Septembre, 1480.) (Id., *ibid.*, fol. 65.) Brach., XXXII. A Jehau le Nonnant, varlet de fourrière dudit seigneur, 23 l. 2 s. 4 d.—Pour avoir fourny par chasoun jour depuis le douzième jour

The following extracts lead to the conclusion that these flowers were for something else than for ornamenting the King's room simply: Avicenne, Canon, *De cura melancholiæ*, says: "Let him sit in places where the temperature is good and let the air of the room be moist and fragrant. It is universally desirable that in breathing odors he should smell pleasant odors and fragrant flowers."²² That actual flowers in nervous troubles were not indispensable the following prescription shows: "Let the epileptic smell day and night this confection [of calamint and rosewater]. It can be made into an apple, and when he wakes in the morning he can hold it in his hand."²³ But the next shows that they seem to have been frequently preferred: . . . "The room of the epileptic should be suffused with hyssop, rhue, stryax, and calamint,"²⁴ and "the house should be well lighted, without pictures, and there should be a great deal of fragrance."²⁵

de juing jusque au 15 jour d'aoust ensuivant de roses fresches pour mettre es chambres et retraict dudit seigneur, pour en avoir envoye chercher a Montbazon, Montoire, Montdoubleau et autres lieux. (11 mars, 1481.) (British Museum, Mss. Egerton, 833, fol. 43.) Brach., XXXII. A Robert Gautier, tapissier dudit seigneur, pour avoir fourny de coqmente et autres herbes pour mettre es chambres dudit seigneur par tous les lieux où il a esté durant le mois de septembre dudit an. (16 dec. 1481.) (Id., *ibid.*, fol. 34.) Brach., XXXIII. A Jean Gebert 64 s.—Pour avoir fourny du rouy marin et marjolaine pour mettre es chambres dudit seigneur depuis le jour de Noël jusques au vingt sixiesme jour de janvier ensuivant." (6 mars, 1482.) (Id., *ibid.*, fol. 26.) Brach., XXXIII. A Patrix Gebert 8 l. 17 s. 8 d.—Pour ses paynes et sallaires d'avoir fourny et porté en la chambre dudit seigneur des violectes, fleurs d'espines, adglentiers, groseliers et autres nouveaulxtez depuis le 20 jour de mars jusques au derrenier jour d'avril, 1482." (Id., *ibid.*, fol. 72.) Brachet, XXXIII.

²² "Et sedeat in locis temperatis et humectetur aer hospitii ejus et odorificetur, sternendo odorifera in ipso, et universaliter oportet, ut semper olfaciat odores bonos, et flores boni odoris." Avicenne, Canon, Lib. III, Tr. 4, XX, Brachet, XXX.

²³ "De cura epilepsiæ. "Utatur epilepticus ista confectione in qua inveni magnum juvamentum: ambrae grise calamintæ ana i conficiantur cum aqua ros. optima. Odores epilepticus die ac nocte totam confectionem, vel fiat pomum de ista confectione, quod teneat in manu. Cum mane surrexerit et teneat pomum dictum in manu." *Lilium Medicinæ*, II, p. 25. Brachet, XXX.

²⁴ "De cura epilepsiæ. "Camera epileptici suffumigetur cum hyssopo ruta et strace et calaminta." (Id., *ibid.*, II, p. 25.)

²⁵ "Domus debet esse clara luminosa, sine picturis et debent ibi esse multa odorifera." (Id., *ibid.*, II, Cap. XIX.)

This stimulation of the olfactory nerve bears the same testimony as musicotherapy that the King was being treated for some form of nervous disorder. There is as yet no specific indication as to the disease, but the suspicion as to what it may be is confirmed by an examination of the things especially to be avoided in epilepsy: (a) Sleep in the daytime; the *Lilium Medicinæ* says: "Sleep in the daytime should be especially avoided."³⁷ "He should not sleep in the daytime, for a long heavy slumber is very harmful."³⁸ "Sleep in the afternoon is very bad, and in general much sleep does harm."³⁹ It will be recalled that the shepherds played to keep the King from falling asleep. (b) Allowing the head to be cold. This induces sleep,⁴⁰ and since, according to Hippocrates (*Coaques*, Section 342, Ed. Littre, V. 657) excessive sleep is provocative of epilepsy, the epileptic should have his head well covered. (c) Insulation. The *Lilium Medicinæ* says of things to be avoided in epilepsy: "Too great cold, and everything that suddenly makes the head warm, such as long exposure to the sun."⁴¹ The Canon of Avicenne says: "All excessive heat of the sun, and cold, is conducive to epilepsy,"⁴² and, ". . . it is especially desirable that the head be protected against excessive heat and cold."⁴³ The traditional likeness of Louis XI, wearing the old felt hat, from which he was inseparable, at once occurs to the mind, and this hat becomes very significant when the reason he wore it so constantly is made plain. Apparently he had adopted a very definite means for pro-

³⁷ "Potissimè vitet somnum diurnum." *Lilium Medicinæ*, Particula II; *De passionibus capitis*, Cap. XXV. *Quæ vitanda in epilepsia*. Brachet, XXXVIII.

³⁸ "Non dormiat de die, somnus enim profundus multum nocet et longus." (*Id.*, *ibid.*, XXVI.)

³⁹ Avicenne, Canon, Lib. III, Tr. 5, Cap. XI, de cura epilepsiæ. "Et multum dormire post meridiem nocet; et universaliter somnus multus nocet." Brachet, XXXVIII.

⁴⁰ Galen, *De locis affectis*, L. III, Cap. V, edit. Venise, 1576, folio T. IV, p. 16, v. f.

⁴¹ *Lilium Medicinæ*, II, 25, "Quæ vitanda in epilepsia. Frigiditas nimia et omne illud quod subito calefacit caput sicut est longa mora in sole." Brachet, XL.

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They were uniformly double; a scarlet one when he rode horseback and a double white or black nightcap over which he drew at night a scarlet bonnet tied with six strings. Sometimes, apparently for greater insulation, they were lined with felt or with beaver."

(d) The head should be kept elevated. This is enjoined in Avicenne's Canon, *De cura epilepsiæ*; "He should take care to keep his head elevated, and as far as possible not to bend over."⁴⁸ And the same thing is repeated in the *Lilium Medicinæ*: [The epileptic] "should particularly avoid lying upon his back, and with his head hanging down. He should not sleep in the daytime, as has been said, and he should sleep with his head raised."⁴⁹ Louis apparently

"*"Pour deux tocques d'escarlate doubles pour servir au Roy à porter de jour quant il chevauche par pays." (Arch. Nat. Comptes de L'Argenterie, kk. 61, fol. 29, Nov., 1468.) "Pour deux bonnetz noirs doubles pour servir audit seigneur à porter de jour." (Id., ibid., fol. 20, Nov., 1468.) "Pour deux tocques blanches doubles pour servir au Roy à mettre de nuyt, 60 s. Pour ung bonnet d'escarlate fait à six fils pour servir audit seigneur à metre par dessus lesdites tocques, 35 s." (Id., ibid., fol. 39, Avril, 1469.) "Pour deux tocques blanches doubles à mettre de nuyt pour ledit seigneur, 60 s. Et pour ung fin bonnet d'escarlate fais à six fils pour audit seigneur à mettre de nuyt pardessus les dictes tocques, 35 s." (Id., ibid., fol. 47, Septembre, 1469.) "Audit Glaude Lambert, la somme de 60 l. 5 s. tant pour un voyage d'estre allé et venu de la ville de Montpellier à Romme echapter et payer treize chappeaux de bièvre, et iceulx avoir apportez en ladite ville de Montpellier pour la personne du Roy comme pour l'achapt d'iceulx.*

"*Audit Thomas Cardonne dit l'Enfant de Rouhan, chappelier, la somme de 212 l. 4 s. 9 d. tant pour le façon de neuf autres chappeaux pour la personne dudit seigneur en ladite ville de Montpellier que pour l'echapt de layne et autres fraiz nécessaires qu'il a convenu faire." (Comptes originaux de règne de Louis XI, Oct., 1478-Oct., 1479, Bibl. Nat. f. fr. 23265, fol. 6.) Brachet, XLI-XLII.*

⁴⁸ "*De cura epilepsiæ, et studeat ut caput suum sit elevatum et caveat ne ipsum pendere faciat in quantum possibile est . . .*" Avicenne, Canon, l. 111, tr. 50, Cap. XI. Brachet, XLL.

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thought these precautions were worth following, for the manuscripts discovered by Brachet in the Archives Nationales and in the British Museum show that in 1481-1482 he carried about with him, everywhere he went, a special headboard, apparently for the purpose."

Nothing would seem to be more evident from these remedies than that the King was following the advice of his physicians in being treated for some very severe nervous affliction which looks like epilepsy, a disease which might prepare the way for later mental disturbances but which would not necessarily impair the King's political acumen. This hypothesis offers a reasonable explanation, at least from the standpoint of pathology, of the mysterious passage about the shepherds in Gaguin and in the Scandalous Chronicle.

On the other hand, the political historians in the past, lacking this biological basis, have been forced to draw many times upon their imaginations for a plausible explanation of the very serious incidents related by the chroniclers. In pointing out the obvious fact that these accounts are unreliable as history, it need not be remarked that they illustrate, nevertheless, a very important principle. The extracts which follow, most of them found in Brachet, are taken from standard histories of France and deal with the passage about the shepherds. Chateaubriand says: "The honesty and rustic simplicity of the country lads and lassies who came to figure in the donjons of Plessis served to smooth the brow of the

"A Guillaume Genou 40 l. 2 s. 1 d. pour cheval de poil bay pour servir à porter après lui le dossier de la chambre dudit seigneur." 30 juin, 1481. (Arch. nat. kk. 64, fol. 140.) "A Guillaume Genou dit Rondelet 25 l. 2 s. 6 d., pour avoir mené et conduit sur ung cheval le dossier pour servir au lit dudit seigneur depuis le vingt cinquième jour de juing jusques au derrenier jour d'aoust ensuivant." 9 sept., 1481. (Arch. nat. kk. 64, fol. 167.) "Claude Foulon 27 l., pour avoir mené sur ung cheval sommier dedans ung bahu de cuir un gros loudier pour servir ès logiez dudit seigneur à mettre derrière le chevet de son lit par tous les lieux où il esté depuis le 18 jour de novembre jusque au premier jour de fevrier ensuivant." 5 fevrier, 1482. (British Museum Mss. Egerton 883, fol. 29.) "A Gilles Genest 47 l., pour avoir mené sur ung cheval sommier ung dossier de boys pour servir es logiez dudit seigneur à mettre derrière son lit où il a vacqué depuis le premier jour de septembre jusques au premier jour de janivier ensuivant." (Id., *ibid.*, fol. 29, 10 mai, 1482.) Brachet, XL-XLI.)

tyrant."⁴⁸ If the reader will recall just what Gaguin and Jean Le Roye say about the shepherds, the following historical embroidery will be interesting. Zevort, a modern writer, makes this contribution: "The greatest distraction of Louis was on Sunday to watch the joyous gambols of the young men and women who danced before the château."⁴⁹ Even so reliable a historian as Henri Martin follows the errors of the others. He says: "He [Louis] abandoned himself to a thousand fantasies to secure a moment from the ennui which consumed him. He summoned from all sides players on 'low and sweet instruments,' and had shepherds come who played airs before him and danced the dances of their native country. But nothing succeeded in distracting him; the object of his caprice once attained caused him only impatience and disgust."⁵⁰ An older history adds considerably to what the chroniclers recount. "Shepherds and shepherdesses," it says, "gathered together from Poitou; they were divided into several bands. Some played on their rustic instruments; others sang and danced in the meadows. Louis sometimes at the window and sometimes walking in the gallery saw and tried to participate in these harmless and innocent pleasures, but if he saw that he was observed, or that anyone was watching him he withdrew and did not dare to appear again."⁵¹ The two accounts next following

⁴⁸ Des danses de jeunes paysans et al jeunes paysannes qui venient figurer dans les donjons du Plessis le bonheur et l'innocense champêtre servaient à dérider le front du tyran. Chateaubriand, *Analyse raisonnée de l'histoire de France*, I, 185.

⁴⁹ "La plus grande distraction de Louis XI était le dimanche, de regarder les joyeux ebats des jeunes gens et des jeunes filles qui dansaient sur la place du château." Edgar Zevort, *Hist. nationale*, 1890, 31^e edit., p. 31.

⁵⁰ "Il s'abandonnait à mille fantaisies pour secourir un moment l'ennui qui le rongait . . . Il mandait de tout parts des joueurs de 'bas et doux instruments'; il faisait venir des bergers qui jouaient devant lui les airs et dansient les danses de leur pays. Mais rien ne réussissait à le distraire; l'objet de son caprice, à peine atteint, ne lui causait plus qu'impatience et dégoût." Henri Martin, *Hist. de France*, VII, 140.

⁵¹ "On rassembla les bergers et les bergères du Poitou; on les partagea en plusieurs bandes, les uns jouoient de leurs instruments champêtres; les autres chantoient et dansoient dans la prairie; Louis, tantôt aux tenètres de son appartement et tantôt promenant dans une galerie voyoit et tâchoit de partager ces plaisirs vrais et innocents; mais s'il venoit à s'apercevoir que quelqu'un le regardait, il se retiroit, promptement, et il n'osoit plus paraître." Velly, Villaret, Garnier, *Hist. de France*, 1768 XIX, 117.

state either frankly or covertly what their authors suspect that the chroniclers have been led to conceal. "There is a pleasure in reading in the histories all that the fear of actual death and the loss of authority made King Louis do in the closing years of his reign; the dance of young girls before his lodgings and the bands of flute players collected from all sides to divert him,"⁸² and "without believing at all the strange and ferocious tales of the last acts of this Tiberius, sick and voluntary prisoner, and without pretending that he bathed in the blood of children, that young girls came to dance lascivious dances in his chamber, it is certain that his cruelty and defiance redoubled at the approach of death."⁸³ Even so recent a biographer as Christopher Hare (1907) offers the traditional explanation that the shepherds played for the King to beguile the long hours.⁸⁴

All these accounts are wrong as history. This does not mean, however, that they have not been carefully written. Most of them have been. It does mean that no explanation of incidents in royal biography is safe until the possibility of a pathological interpretation has been eliminated.

To continue with the remedies: The Scandalous Chronicle says: "To heal these maladies there were made for him terrible and marvelous remedies by the physicians and doctors who had care of the King's person."⁸⁵ Gaguin says in 1482: "Every day Louis was

⁸² "Il y a plaisir de lire dans les histoires tout ce que la crainte de la mort réellé et ceile de perdre son autorité, faisoient faire au Roi Louis durant les dernières années de son règne. Les danses de jeunes filles à l'entour de son logis, et les bandes de joueurs de fiûtes qu'on amassait de toutes parts pour le divertir, etc." Mezeray, *Abrégé Chronolog. de France*, II, 618.

⁸³ "Sans croire tout ce qu'on a raconté d'étrange et de féroce sur les derniers actes de ce Tibère malade et volontairement prisonnier, sans prétendre qu'il prenait des bains de sang d'enfants, que de jeunes filles venaient danser sa chambre des danses lascives, il est certain que sa cruauté et défiance redoublèrent aux approches de la mort." Charles Lacreteille, *Louis XI*, p. 68. The extracts quoted above are from Brachet, LI-LII.

⁸⁴ "While he was watching death approach step by step we do not wonder that he sent for musicians, 'joueurs de doux et bas instruments,' to beguile the long hours of suffering and isolation." *The Life of Louis XI*, Christopher Hare, New York, 1907, p. 258.

⁸⁵ "... l'our le guérir desquelles maladies furent faictes pour lui, par les médecins qui avoient la cure de sa personne, de terrible et merveilleuses médecines." *Chron. Scandaleuse*, éd. mandrot, II, 138. Brachet, XLVI.

more and more sick, and his physicians offered remedies to him of a marvelous kind, for he vehemently hoped to acquire health by means of human blood drawn from certain youths, which he drank and bathed in."⁸⁶ The shock that comes with this reference to the use of human blood is natural, and the historians, in their ignorance of medieval medical practice, are justified in their incredulity or horror of it.⁸⁷ But the use of human blood takes on quite a different aspect when it becomes plain that it was a remedy pure and simple for a specific disease. Galen prescribes human blood for epileptics—a sovereign remedy for this disease from the time of antiquity⁸⁸ until the eighteenth century at least⁸⁹—and modern medicine, of course, recognizes in the transfusion of blood a valu-

⁸⁶ "Tous les jours de plus estoit Loys mallade et ne lui prouffitoient les médecines quises en merueilleuses manières. . . . Car vénementement esperoit acquerir santé par le sang humain qu'il but et huma de quelques enfans." Robert Gaguin, 1482, éd. 1508, f. CCII, V^o. Brachet, XLV.

⁸⁷ "On avait si mauvaise opinion de lui, que les rumeurs les plus bizarres et les plus atroces s'accréditèrent au sujet des remèdes qu'il employait pour retarder a fin. On prétendit que Louis, par l'ordonnance de Coictier, 'buvoit et humoit' le sang des enfans afin de réchauffer son sang appauvri." Henri Martin, *Hist. de France*, p. 153.

"Une chronique dit qu'on lui faisait boire du sang d'enfans nouvellement égorgés, remède plus convenable au caractère d'un tyran qu'a la santé d'un malade. Crime horrible, péché mortel." Liskenne, *Hist. de Louis XI*, p. 301.

"Puis il buvait du sang de petits enfans pour se redonner de la jeunesse; remède qui semblait tout à fait approprié au tempérament du malade." Chateaubriand, *Analyse Raisonnée de l'Histoire de France*, I, 185.

"La profonde réclusion dans laquelle il vivait faisait croire qu'il se passait des choses bien extraordinaires dans ce château impénétrable. On alla jusqu'à répandre le bruit que l'on y rassemblait des enfans que l'on saignait, et dont on lui faisait boire le sang pour corriger l'âcreté du sien." Anquetil, *Hist. de France*, II, 207. Brachet, XLVI-VII.

⁸⁸ "Epileptics (comitiales morbi) drank the blood of gladiators, also, as from living cups." *Sanguinem quoque gladiatorum bibunt, ut viventibus poculis.* (Pliny, XXVIII, 2. Brachet, XLIV.)

⁸⁹ "Human blood.—Virtues: Human blood, fresh and drunk warm, is said to benefit epilepsy." *Sanguis humanus.—Vires: Sanguis humanus (recens adhuc et calde potus) conferre dicitur ad epilepsiam.* (Magnet, *Rerum ad Pharmaciā Galenico Chymicā Spectantium Thesaurus*, 1703, l. 1, p. 987. Brachet, XLIV.)

"All the writers recommend human blood for healing epilepsy." Tous les auteurs recommandent le sang humain pour la guérison de l'épilepsie. (*Pharmacopée Royale Galénique et Chimique*. Moses Charas, edit. de 1773, t. II, p. 418. Brachet, XLV.)

able restorative. Louis probably did take human blood for his malady, although we have only a hint as to how he got it.⁶⁰ He also probably submitted to the heroic treatment of having his head cauterized with a hot iron,⁶¹ a recognized therapeutic agent in epilepsy in the Middle Ages.⁶²

Medieval medicine further suggests a solution of gold to be drunk as medicine in psychoneurotic cases. Avicenne, Canon, says: "The limatura of gold is good for tremor of the heart [Louis complained of this] and for depression of the mind and for him who talks alone."⁶³ Indeed, the salts of gold is a recognized modern remedy in cases of spasms and convulsions. The records show that in 1483 a certain man received the sum of 192 livres of gold for a beverage called "potable gold" ordered for the King by his physicians (Legeay, Louis XI, II, pp. 506), and Louis probably took this, too.

Furthermore, it is interesting to notice another means of obtaining relief from sickness in the Middle Ages, which furnishes an indirect means of diagnosing a disease. This is hagiotherapy, or the invocation of the saints which protect against certain afflictions. Taken alone, this agency should not serve as a basis for any conclusion as to the disease itself, but it is a very useful check upon other data as indicating from his prayers and gifts to certain saints what the patient himself thought was the matter with him. The documents in the various archives show conclusively that Louis XI had frequent recourse to the intercession of the saints who were to be specifically invoked in epilepsy, spasms, and convulsions—St. John the Evangelist, St. Giles, St. Claude, and St. Paul, for example.⁶⁴ Moreover, the gifts of Louis to the saints invoked for

⁶⁰ In the royal accounts for this date there is a receipt which reads as follows: "To John Pellart, the sum of £9 12 s. 6 d. ordered paid to him by the said lord (Louis) the aforesaid day for having been bled by the order and command of the said lord on two occasions for demonstration (espreuve). A Jehan Pellart la somme de £9 12 s. 6 d. a luy ordonnée par ledit seigneur ledit jour pour avoir este seigné par l'ordonnance et commandement dudit seigneur par deux fois pour espreuve." 29 juin, 1482. (British Museum. Mss. Egerton, 883, fol. 62. Brachet, XLVI.)

⁶¹ Brachet, XXXI-XXXII, 13.

⁶² Avicenne, Canon, l. III, Tr. 4, Cap. X, de cura melancholix. "Et quandoque oportet ut caput ejus secundum crucem cauterization, si nihil aliud confert."

⁶³ Avicenne, Canon, Bk. II, Tract. 2, Cap. LXXVIII. Brachet, XXXV.

⁶⁴ Du Broc de Segagne, Les Saints Patrons (cited in Brachet, XLVIII.)

epilepsy became finally so great that Parlement again and again opposed the alienation of parts of the royal domain for this purpose.⁸⁸

Now, it seems fair, from the symptoms and from the remedies employed by Louis, to conclude that the King was very sick with some nervous malady, and that the particular malady could not be anything else than epilepsy.

But if Louis had epilepsy, why did not the physician announce the fact? The reason in the Middle Ages, even more than to-day, was that epilepsy was a reflection on the patient and upon his parents, and its existence was always concealed when it was possible. Hence, for example, the silence of Commynes upon the remedies taken by the King.

This fact explains why Louis had recourse to a strange procedure: He made gifts and asked the intercession of the saint protecting against the quartain fever, not that he might be spared, but that it might please God to send him that disease. "Because," he explains, "the doctors say that I have a sickness of which I may never be cured unless I have the quartain fever."⁸⁹

History as such cannot explain this strange request, but medieval medicine does so without trouble and in this way. Hippocrates 2000 years ago laid down the principle of the substitution of one disease for another. "Persons taken with the quartain fever," he says, "are never taken with the great sickness [epilepsy], and, if taken first with that affection they get the quartain fever, the first is healed by the second."⁹⁰

Louis had epilepsy, and any lingering doubt as to the fact is dispelled by the direct statement of Gaguin that he had it: "At that time [1480] Louis began to be very sick. For the comitial sickness [epilepsy], which for a long time had oppressed him, demanded the most diligent efforts of his physicians."⁹¹

⁸⁸ Brachet, L., British Museum, Egerton Mss. No. 1668, fol. 299.

⁸⁹ Arch. du Cher, Fonds du Chapitre, d. Raynal, Hist. du Berry, III, 132. Brachet, LXXX.

⁹⁰ "Les individus pris de fièvre quarte ne sont jamais atteints de la grande maladie (l'épilepsie); et, si, pris d'abord de cette affection, la fièvre quarte leur survient, celle-ci les guérit de celle-là." Hippocrates, Epidémies, VI, 6, 5 (tr. Littré, V, 325). Brachet, LXXXII.

⁹¹ "... Sed per id tempus aegrotare maxime Ludovicus coepit. Nam comitali morbo cum inter dum premeretur, ... Quamobrem medicorum diligenti opera usus est." Robert Gaguin, f. 279, Brachet, LXXIX.

It is perfectly clear, therefore, that Louis was not a Tiberius, exhausting every means to please his jaded senses, but a miserable nervous wreck, trying to recover his health by the most advanced scientific treatment of his age, and if he is not an object of compassion, his actions, at least, demand sympathetic interpretation.

The fact that Louis suffered many years from attacks of epilepsy is in itself sufficient indication of a very serious nervous condition, whatever produced it. He had a bad inheritance of gout, insanity mania, and obsessions of one kind or another from his various ancestors. Space does not permit of a discussion of this statement, but Brachet's researches⁷⁰ furnish ample warrant for the assertion that the terrain in the King's case was very bad indeed.

Before going further, it is desirable to recall the medical hypothesis mentioned earlier, that in cases of hereditary neurasthenics, after a severe or exhausting illness, some form of mental disturbance is a more or less certain sequence.

The pathological history of Louis XI forms no exception to the general formula, and, following his bitter experience at Péronne, in 1468, and his very serious illness in 1479, there are recorded the following acts which can be interpreted only as psychopathic outbursts, latent or repressed before, but common in one form or other to all hereditary degenerates: (a) Louis develops a mania for lavish expenditures (a form of megalomania) so foreign to his general character; (b) a morbid fear of death, an obsession with Louis (thanatophobia); (c) a mania for collecting things, simply for the sake of collection (collectomania); (d) an irresponsible mania for seizing things which he wanted (kleptomania); and finally, (e) a morbid love for animals (zoophilia).

His illness in 1479 was so severe as to lead to the report that the King was not only helpless, but was actually dead.⁷¹ The pivotal

⁷⁰ His *Pathologie Mentale* devotes something like 700 pages to the subject.

⁷¹ "... Wherefore the report was widely spread throughout all the lands of the Duke that the King himself had declined into such weakness of body that he could neither ride horseback nor be conveyed in a chariot, nor could he get any better either by the aid or diligence of his physicians. This popular rumor filled not only the lands of the Duke, but very many of the provinces of the realm as well, so that many reviled him and secretly cursed him as not sick but dead." "... Ex eo re rumor increbuit per omnes terras ducis quod ipse rex in talem corporis sui invaletudinem incurrerat, quod nunquam nec equo, nec carru vectari posset, nec inde ulla

point of his reign is here, and by reason of that very sickness. For it is from this illness that a series of acts may be dated which should be classed as explosions of megalomania.

He purchased 22 caps at once, during the winter of 1478-79, for example, paying 700 francs apiece for them—a very significant change from the avaricious Louis. After this year he changed his habits completely, dressed extravagantly, and gave away lavishly. Commynes, of the earlier part of his reign, says: "The King dresses very shabbily, so badly that it could not be worse. The material is bad enough at any time, and he wears an old hat, different from the rest, with a lead image on it."¹¹ But after 1479 Commynes is obliged to record the fact, already cited, that he "dressed richly, a thing which he had never been accustomed to do before, and wore only satin robes lined with good marten fur, and he gave some of these to persons without their asking." Further evidence of this lavish giving is found in the sums which he gave his physician,¹² and in his excessive gifts to the saints.¹³

He had a morbid fear of death. For a long time during his reign the fact that the King was terribly afraid of death was known and played upon. He released Cardinal Balue and Bishop Berdun from their cages because of the fear that God would send judgment upon him for keeping a cardinal and a bishop in chains. Furthermore, his fear that he would die was so great that he became an absolute slave to his physician,¹⁴ Coictier, to whom,

medicorum ope aut industria convalescere. Qui rumor nedum terras ducis, sed plurimas etiam regni provincias vulgo adimplevit; ita ut etiam eum, nedum ægrotum, sed mortuum esse plures susurrarent et clanculo jactitarent." Basin, *Hist. Ludow. XI*, vol. 3, Lib. VI, Cap. XIII, pp. 40-50.

¹¹ "Nostre roy se habilloit fort court, et si mal que pis ne pouvoit, et essez mauvais drap aucunes fois, et portoit ung mauvais chapeau, different des autres, et ung image de plom dessus." (Commynes, ed Dupont, I, 166. Brachet, CL.)

¹² In less than eight months he gave to Coictier, his physician, 98,000 crowns.

¹³ " . . . A great part of the domains were in this way disposed of, and had he lived a few years longer the revenues of the kingdom would have passed into the hands of the churchmen." Duclos, *Louis XI*, II, 319.

¹⁴ " . . . The doctor used him very roughly indeed; one would not have given such outrageous language to one's servants as he gave to the King, who stood in such awe of him that he durst not forbid him his presence." Commynes, Scobel, edit. II, 74.

according to Commynes,⁷⁵ he paid 10,000 crowns a month in the hope that he would lengthen the King's life and all that Coictier had to do to get anything that he wanted was to threaten to leave.⁷⁶ Everyone apparently knew about this fear, for Sixtus IV, to win his favor, let Louis know that he had granted indulgence to all such as should visit churches to pray for his recovery. Even Charles the Bold seems to have known the abject terror to which the King gave way; and Commynes was, of course, thoroughly familiar with it. His account leaves no doubt at all about the fact, for he says: "Never was a man more fearful of death nor used more means to prevent it. He had, all his life long, commanded and requested his servants . . . that whenever we saw him in any danger of death we should not tell him of it, but merely admonish him to confess himself, without ever mentioning that cruel and shocking word 'death,'"⁷⁷ and Commynes, otherwise so careful of the reputation of the King, nevertheless confesses that when St. Francis de Paul came to him from Rome, Louis fell upon his knees before the hermit and besought him to prolong his life.⁷⁸

His voluntary isolation, which historians have found so hard to explain, may have been a sign of his morbid mental condition after 1479, but it seems plausible to assume that Louis was again following the advice of his physicians. The records show that in the winter of 1478-79 Louis was very sick, and that it was difficult to see him. It was in 1479 that, to avoid being seen and to render access to his person even more difficult, the King had the contrivance of sharp stakes, called "caltrops," placed along the roads approaching his castle, and he continued to shun meeting anyone.

It is profitable to compare the statement of the medical authorities upon this question of seclusion with that of the historians. From a medical standpoint, above all things else prescribed for epileptics was isolation. The *Grant Proprietaire des Choses* says: "Above all things should the epileptic avoid harmful foods and association with people, because his malady takes him thus more often than when he is alone."⁷⁹ Barante, as an example

⁷⁵ *Ibid.*, II, 71.

⁷⁶ *Ibid.*, 74-75.

⁷⁷ Commynes, ed. Scobel, II, 72.

⁷⁸ *Ibid.*, II, 56.

⁷⁹ ". . . . Devant toutes choses ilz se doivent garder de viands nuisibles . . . et de trop habiter en la compagnie des gens, car leur mal les prent plus tost que quand ilz sont tous seulz." *Liv.*, VII, Chap. IX; Brachet, XCV.

of the historians, accounts for the facts thus: "His mistrust," he says, "became horrible, and almost insane; every year he had his castle of Plessis surrounded with more walls, ditches, and rails. On the towers were iron shields and shelter from arrows, and even artillery. More than 1800 of those planks bristling with nails, called 'caltrops,' were distributed on yonder side of the ditch."⁸⁰ There is no question as to his suspicion and distrust of everyone who approached him at this time; and the advice of his physicians probably simply intensified his desire to keep by himself.

Let us now examine the manifestations of combined megalomania and collectionomania, of which Commynes furnishes the evidence, unconsciously, to be sure, but unmistakably:

... He caused fine horses or mules to be bought at any price whatever, but this was not done in France. He had a great passion for dogs, and sent into foreign countries for them; ... and bought them at a dearer price than the people asked. He sent into Sicily to buy a mule of an officer of that country, and paid him double the value. ... He bought strange creatures wherever they could be found. ... He sent into Sweden and Denmark for two sorts of beasts which those countries afforded; ... for six of each of these beasts he gave the merchant 4500 Dutch florins. Yet when all these rarities were brought to him he valued them not at all, and many times would not so much as speak to the persons who brought them to him. In short, he behaved after so strange a manner that he was more formidable both to his neighbors and subjects than he had ever been before.⁸¹

The significant circumstance in this case is that Louis paid the extravagant sum of 125,000 francs, in modern money, apiece, for certain animals, which he would not look at when they were brought to him. This indifference taken together with the fact that he gave more for what he bought than anyone asked for the animal, is plainly pathological. Commynes makes it appear that all this took place in the last years of the King's life, but the records show that similar purchases were made as early as 1479.

Suspicion points to Louis as an hereditary degenerate. His actions seem to furnish a most clear-cut manifestation of the conventional stigmata of degenerate zoophilia—that is to say, a morbid love for animals and a hypersensitiveness as to their comfort. These stigmata are (1) extravagance of purchase; (2) indifference of the purchaser; and (3) hypersensitiveness to the suffering of sick animals. The first two traits are common to morbid collectionomania, the third, always associated with indifference to the

⁸⁰ Guizot, III, 256.

⁸¹ Commynes, ed. Scobel, II, 57-58.

suffering of human creatures, and often with extreme cruelty, is decisive for zoophilia.²²

The illustrations of zoophilia, which follow, are interesting, because they are so precise; the King's great cruelty has already been mentioned. Commynes further says: "The King inflicted very severe punishments to inspire dread, and for fear of losing his authority, as he himself told me, . . . so that he passed his time in making and ruining men." As to his morbid interest in animal suffering, the illustrations could not be more explicit. "March 30, 1479 [paid], to John de Reffou . . . 53s. for having brought in a litter and by water from Fourges to Tours, a hunting dog which was sick."²³ "Oct., 1480, to Jacques de Saint Benoist, for the purchase and carting of a boat which he took by order of the King and for using it to bring a stag to the pool of Gastine, that it might die there."²⁴ "July 4, 1481, to Vincent l'Aumosnier, 50s. for having brought, in a three-horse chariot, from Garrannes to Dreux, . . . one of the King's greyhounds which was sick."²⁵ "To Louis Lucas, £6 19s. from the King . . . for having brought, in a two-horse chariot, a rabbit of the King's from Forges . . . to Bonne Aventure."²⁶

²² Ballet, *Intermittent Morbid States of the Emotions*, in his chapter on "Zoophilia and Zoophobia," says: "That which demonstrates the morbid character of this state, aside from *abulia* and emotionalism, is the indifference, often complete, of the Zoophiles for their own relations and friends, and for human suffering generally, to which indifference there is sometimes added a veritable cruelty." See also *The Zoophil-Psychosis*, by Charles L. Dana, M. D., *Medical Record*, March 6, 1909, and *Zoophile et Zoophobie*, *Extrait de la Belgique Médicale*, 1897, par Ch. Féré.

²³ "30 mars., 1479. A Jehan du Reffou, maistre d'ostel dudit seigneur, 53 s. 4 d. t. . . . pour avoir fait mener en une lictière et par eaue, depuis les Forges Jusques à Tours, ung chien courant qui estoit malade." (Arch. nat. kk. 64, fol. 17. Brachet, CXV.)

²⁴ "Octobre, 1480. A Jacques de Saint-Benoist, . . . pour l'achapt et charroy d'un bastea qu'il a prins par l'ordonnance dudit seigneur, et le fait mener a l'estang de Gastine, pour y faire mourir un cerf." (Arch. nat. kk. 64, fol. 158v, Arcq. p. 393. Brachet, CXVI.)

²⁵ "4 juillet, 1481. A Vincent L'Aumosnier, 50 s. . . . pour avoir fait mener en une charette à trois chevaulx ung des lévriers dudit seigneur qui estoit malade, de Garannes à Dreux . . ." (Arch. nat. kk. 64, fol. 150. Brachet, CXVI.)

²⁶ "A Loys Lucas, . . . 6 l. 10 s. . . . pour avoir faict mener et conduire à une charecte à deux chevaulx ung des lièvres dudit seigneur des forges . . . à Bonne Aventure." (Arch. nat. kk. 64, fol. 116. Brachet, CXVII.)

Now, having stated the hypothesis of zoophilia, still following Brachet, the deductive method may be used thus: In the case of the degenerate zoophile there are usually found pronounced symptoms of kleptomania. We are sure to find that Louis was a kleptomaniac. For, by an inconsistency which is the mark of this morbid condition, the sick man steals that which he covets, not because he cannot buy it, but because stealing is more agreeable to him as a kind of conquest.

Thus the records furnish what may be fanciful evidence that Louis did not scruple to rob his subjects' henroosts on occasions: "January, 1483, . . . In this month the King commanded that his servants should travel all night along all the roads and on the River Loire ahead of certain birds of Turkey, which were being taken to Brittany, to take them and bring them to him." "Item, two days afterwards the birds were found at 8 o'clock at night and were brought at that time to Montilz."⁸⁷

Possibly the next illustration is simply a piece of high-handed tyranny on the King's part, but it took place at a time when he was spending enormous sums for other animals and he could easily have paid his subjects for theirs. Viewed in connection with his other actions at this time, seizure has a suspiciously pathological complexion, if it is not definitely a case of kleptomania:

By the King's grace he commanded a most base thing to be done. . . . For he sent commissioners to the town of Rouen and many other places of the realm, who ordered, on the King's authority, under penalty of confiscation of goods and body, that all dogs, large and small, should be brought together to one place. Being thus collected, they carried away the best of these, tied in carts and wagons, to the King.⁸⁸

⁸⁷ "Janvier, 1483. Item. audit moys le roy manda que on allast toute nuyt par tous les chemins et sur la riviére de loire audavant de plusieurs oyseaulx de Iurkie, qu'on portoit en Bretagne, pour les prendre et les lui apporter. Item, Deux jours apres les oyseaulx dessusditz fuerent trouvez a huyt heures de nuyt et les convint porter a ladite heure aux Montilz." (*Comptes de Tours*, t. XLIV, fol. 82 V°. Brachet, CXVII.)

⁸⁸ "Cujus etiam rei gratia, rem stultissimam . . . fieri jussit. Misit enim commissarios ad urbem Rothomagensensem et alia plurima regni loca, qui ex ipsius auctoritate juberent sub pœna confiscationis corporis et bonorum ut omnes canes, parvi et magni, ad unam plateam ducerentur. Quibus sic in unum collectis, quos ducerent eligendos, ad regem in carrucis et vehiculis ligatos veherent. . . ." (*Thos. Basin, Hist. Lud. III, 168, Brachet, CXVII.*)

There remains to consider an incident which took place in 1468, after Louis had ventured to intrust himself to the power of his arch-enemy, Charles the Bold, at Péronne. Relying upon his subtlety and cunning words to secure his ends, Louis had boldly gone in person to Charles at his castle in Péronne. The discussion had gone on smoothly enough for several days when Charles learned that Louis was arousing the people of Liège—Charles' subjects—against him. In a terrible passion Charles imprisoned Louis, threatened to depose him, and even to take his life. Louis in his terror agreed to the most humiliating conditions of peace with Charles. Among others, he was compelled to march in person along with Charles against the people of Liège, and actually hurled back the cry, "Vive la Bourgogne!" against the people of that city when they shouted "Vive la France!" The incident took place upon his return to Paris after this chagrin of Péronne. It is as follows:

And on the same day [Saturday, November 19, 1468] there were taken for the King, in the city of Paris, all the magpies, jays, and owls, either in cages or not, belonging to private individuals, and brought before him. And the places from which these birds were taken were written down and registered, as well as all that could speak words such as "Thief," "Wanton," "Hey, get out," "Pérette, give me a drink," and several other fine phrases which those birds had been taught and knew how to say. Then, again, by another commission of the King there were sought out and taken all the stags, hinds, and deer that could be found in Paris and were brought to Amboise.⁹⁹

The account which Gaguin gives of this affair is substantially the same. He says: "I doubt whether I should write down at all what actually took place, a deed in its novelty unworthy of a king. Magpies and grackles which had been taught to whistle or to imitate the human voice, which were kept in cages by the Parisians for

⁹⁹ "Et, ce mesmes jour, fuerent prinses pour le roy. . . . En ladite ville de Paris tous les pyes, jays, chouetes estans en cage ou autrement et estans privée, pour toutes les porter devers le roy. Et estoit escript et enregistré le lieu ou avoient este prins lesdiz oiseaulz et aussi tout ce qu'ilz savoient dire, comme: 'Larron! Paillart! Filz de Putain! Va hors. Va! Pérette, donne moy à boire!' et plusieurs autres beaux motz que iceulx oiseaux savoient bien dire et qu'on leur aavoit aprins. Et depuis encores, par autre commission du roy . . . fut venu querir et prendre audit lieu de Paris tous les cerfs, biches, et grues, qu'on y peust trouver et tout fait mener a Amboise. Journal de Jean de Roye, I, 220, Brachet, CVI.

amusement in the house, and soon afterwards stags and deer, all were commanded by Louis to be seized and brought to Amboise.*

These two texts report two important facts: First, on November 19, 1468, after seizing all the talking birds (magpies and jays), as well as those that were mute, the King had them all transported to his park at Amboise, and a little later all the stags, hinds, and deer which the Parisians were keeping in their gardens were carried off to the same place. Second, this double zoological seizure by the King, twice by armed force, of the rare and curious animals of the Parisians for his own use appeared inexplicable and revolted public opinion.

Any attempt to justify this bizarre act psychologically, immediately raises the following questions: (a) Why did the King seize the birds at all? (b) Why a second time the animals? (c) Why seizure instead of purchase—an act which must have seemed both tyrannical and incomprehensible? (d) Why the double seizure immediately after Péronne, when he needed the support of public opinion? And (e) how is this strange action explained by contemporaries? How by modern historians?

Taking the questions up in inverse order: His contemporaries have no explanation to make. Gaguin, who wrote in 1501, and who would let pass no opportunity to discredit the King if he could, is very much amazed at the King's action, but he does not know what to make of it. Commynes, who must have had some ideas about it, for his own purpose conceals the affair, and we are led to suspect that he conceals it in order to protect the King's reputation.

Modern historians, unable to offer anything better, have fallen upon the very remote similarity of the words "Péronne" and "Pérette" as an explanation. Pérette de Châlons had been a mistress to the King some time before this, and although the chroniclers record that the birds said "Pérette," the historians have substituted the word "Péronne" as better explaining the puzzling circumstance. One after the other, Duclos, Sismondi, Barante, Hare, and Michelet, have explained the seizure of the birds on the

* "Quod vero sequitur an scriberem aliquando dubitavi facinus profecto sua novitate indignum rege. Picas et graculos qui in caveis humanas voces vel sibilare vel imitari edocti apud Parisios ad voluptatem domesticæ alebantur: Moxque cervos et grues capi omnes et Ambasiam duci Ludovicus imperat." Robert Gaguin, *Compendium de Francorum Gestis*, Liv. X, f° CXLVII, V°—CXLVIII, Brachet, CVII.

ground that the word "Péronne" reminded the King of his humiliation. Duclos says: "The chronicler further tells us that the same day the King ordered the magpies, jays, and other tame birds to be brought to him, with the names of those to whom they belonged. And it is the common opinion that he did this because the birds had been taught to say 'Péronne.'"⁹¹

Sismondi goes a little further in his explanation when he says:

Nevertheless the King was ashamed of the trap into which he had plunged of his own accord, and did not wish to enter Paris for fear of exposing himself to the ridicule of the people; he even feared so much the raillery to which he ought to be the butt that he seized all the magpies, jays, and crows which had been taught to speak and registered the words which their masters had taught them to pronounce, meaning to punish all those who had made them repeat the name Péronne, or Pérette de Châlons, . . . then the King's mistress.⁹²

Barante thinks that it was in the cause of public order that the birds were taken:

The precautions were indeed so great that there were seized by the King's order all the magpies, jays, and crows, and other privately owned birds to whom the inhabitants of Paris had taught the words "Thief," "Wanton," and "Pérette, give me a drink." The commission responsible for this seizure wrote in its register what each bird knew how to say and with whom it had been found. Such was the fear of what might excite disorder or give offense either to the King or to the Princes.⁹³

⁹¹ "La Chronique dit que le même jour le roi se fit apporter les pies, les geais et autres oiseaux privés, avec les noms de ceux auxquels ils appartenoient, et la tradition est que c'étoit parce qu'on leur avoit appris à dire Péronne." Duclos, *Hist. de Louis XI*, ed. de La Haye, 1750, I, 398. Brachet, CIX.

⁹² "Cependant le roi étoit honteux du piège où il étoit allé se jeter de lui-même; il ne voulut point entrer dans Paris, pour ne pas s'exposer aux propos du peuple; il craignoit même si fort les railleries auxquelles il sentoit qu'il devoit être en butte qu'il fit saisir toutes les pies, les geais, les corbeaux auxquels on avoit appris à parler, et enregistrer les mots que leurs maîtres leur avoient enseigné à prononcer pour punir tous ceux qui leur auroient fait répéter le nom ou de Péronne ou de Pérette de Châlons, bourgeoise de Paris, alors sa maîtresse." Sismondi, *Hist. d. Français*, XIV, 283; Brachet, CIX.

⁹³ ". . . Les précautions furent même si grandes, que l'on saisit par ordre du roi toutes les pies, geais, corbeaux et autres oiseaux apprivoisés, à qui des habitants de Paris avoient appris des paroles, comme: 'Larron, paillard, va, dehors: Pérette, donne moi à boire.' Le commissaire chargé de cette saisie inscrivit exactement sur son registre ce que chaque oiseau savoit dire, et chez qui on l'avoit trouvé; tant on craignoit ce qui pouvoit exciter quelque désordre et offenser soit le roi, soit les princes." Barante, *Hist. des ducs de Bourgogne*, éd. Gachard, II, 332, col. 2; Brachet, CIX.

Christopher Hare does not vary from the traditional explanation:

The whole story of Péronne could not fail to excite the satirical wit of the keen Parisians. The King, after his three weeks anxiety, was unwise enough to show it. He ordered that all who spoke ill of the Duke of Burgundy should be severely punished, while the names were to be taken of all owners of magpies, jackdaws, and other talking birds who had been maliciously taught to cry "*Péronne*."⁹⁴

Michelet tries to reconcile the text of the Chroniclers with what to him is the obvious explanation:

The farce of Péronne . . . the ablest of the able duped. . . . Every one laughed, young and old, the small children, but what am I saying, the very talking birds, jays, magpies, and starlings spoke of nothing else, they knew but one word, "*Pérette*."⁹⁵

So much for the explanations of the political historians, the best that can be offered, without recourse to mental pathology, and all of them, without exception, absolutely wrong. But if they all have the wrong explanation, what is the right one? Brachet offers but one: kleptomania. This, he properly says, explains quite naturally the two seizures of 1468, which roused the people of Paris. But the relation of that act of kleptomania to the date of its outbreak is still to be accounted for, and why the bizarre act took place precisely upon the return from the interview at Péronne in which Louis was within a hair's breadth of being first deposed, and afterwards put to death by Charles the Bold.

Of the three hypotheses—(1) a chance coincidence, (2) exaggerated assertion of the King's authority, and (3) the psychopathic interpretation—the last only is tenable. For in the date of the King's act is to be recognized the law of impulse in degenerates. The depleted mental and nervous condition in which the King found himself upon his return after the detention at Péronne and after the terrible emotional strain which he had undergone led to inevitable nervous exhaustion, 18 months after a severe attack of typho-malaria. It is natural to think that he should find himself unable at this particular time to withstand an irresistible impulse

⁹⁴ Hare, *Life of Louis XI*, p. 159.

⁹⁵ La farce de Péronne . . . l'habile des habiles, dupé . . . Tous en riaient, jeunes et vieux, les petits enfants, que dis-je? les oiseaux causeurs, geais, pies et sansonnets, ne causaient d'autre chose; ils ne savaient qu'un mot, "*Pérette*." Michelet, *Hist. de France*, éd. Flammarion, VI, 242-243; Brachet, CIX.

to zoophilistic kleptomania, which must have tempted him more than once, but which his care for his reputation had held in check. He yielded to that impulse, knowing very well that it was the worst possible moment to do it, and that he had best not yield to it, or at least wait until he had less need for public opinion.⁸⁸

It is Brachet's conclusion, and it seems unassailable, that the psychological interpretation of the King's act in seizing the birds and beasts was an attack of kleptomania in the case of a degenerate zoophile, breaking out consecutively upon a condition of depleted nervous tone, produced in this case by his captivity.

This conclusion is the more acceptable in that it conforms to the three conditions of hypothesis: (a) It is contradicted by none of the observed facts; (b) it explains them all; (c) it discloses the formula of zoophile for the King.

In view of what one king's reign has to contribute to the study of historical pathology, and upon the reasonable assumption that such conditions are not confined to one reign, the question naturally arises: Is it possible to write a faithful biography which fails to consider what bearing the biological factor may have upon the life history of any individual? Assuredly the study of historical pathology has a very definite place in solving the problems of history.

⁸⁸ Féré, *Pathologie des Emotions*, p. 277. "The emotions have pathological effects, the more marked when they are produced at the end of a sickness, in convalescence; in a word, where they act upon an organism already enfeebled."

Notes and Comment.

THE SEVENTY-FOURTH ANNUAL MEETING OF THE AMERICAN MEDICO-PSYCHOLOGICAL ASSOCIATION.—The meeting of the Association in Chicago the first week in June was in attendance, in the character of the papers read, and in general interest, as shown in the discussions, a marked success.

The address of the President, Dr. James V. Anglin, of St. John, New Brunswick, was a stirring appeal to patriotism, and strong and well-considered indictment of German "Kultur." It was an address which roused the feelings of his audience to a high pitch of enthusiasm. Dr. Anglin is one of those who sees from all the expenditure of blood and tears, in all the tremendous sacrifices which have been made, and must yet be made to make the world safe from autocracy and military rule—a place fit to live in—an outcome which shall show that those who have died in the great struggle which convulses the world and those who have sent their sons, as he has done, to battle for justice have not done these things in vain, but, to quote Lincoln's wonderful address at Gettysburg, that through these sacrifices the nations of the earth "under God shall have a new birth of freedom—and that government of the people, by the people, for the people, shall not perish from the earth."

Behind Dr. Anglin while he spoke was a service flag, which had earlier in the session been presented to the Association in behalf of the citizens of Chicago.

This flag contains nearly one hundred stars in honor of the members of the Association who have joined the medical service in the United States military or naval forces, and who are on duty either at home or abroad. This does not represent by any means all the members of the Association who are now serving their country and mankind in the ranks of the military and naval forces, but all that the Secretary had certain knowledge of at the time of the meeting.

The annual address was given by Professor Paul Shorey of the University of Chicago. Nothing which we can say will ade-

quately characterize an address which was as full of wit as it was replete with wisdom. We hope to have the pleasure of publishing the address in the next issue of the JOURNAL.

To make reference to the various papers which were read which would do justice to each is a task beyond us. As would be naturally expected, papers and addresses referring to medical service in the war formed part of the program, among these the addresses of Major E. Stanley Abbott, M. R. C., and Captain (now Major) Frankwood E. Williams, M. R. C., of the army, and Asst. Surgeon Albert Warren Stearns, U. S. Navy, R. F., were notable.

Food and its conservation was the topic of an eloquent address at the evening session of Thursday, June 6, by Professor Ray Lyman Wilbur, M. D., President of Leland Stanford University, now a member of the United States Food Administration. We do not believe that any of his audience came away from the meeting without a clear conception of the absolute necessity for the most rigid conservation of food in order to keep the men on the fighting line properly nourished and in good condition, and to help nourish the civilian population of the countries whose allies we are. All came away with a better and broader comprehension of the meaning and force of the slogan, "Food will win the war."

The paper by Dr. J. C. Mitchell, of Brockville, Ontario, on "Food and Its Service in the Provincial Hospital," was a concise statement of the experiences in Canada under the rules and restrictions of a Food Controller, and will, when published, be of much value in helping solve some of the problems which confront hospital administrators on this side of the line.

CHANGES IN THE EDITORIAL STAFF.—At the meeting of the Council of the American Medico-Psychological Association in Chicago on June 3, the resignations of Drs. Henry M. Hurd and G. Alder Blumer from the editorial staff of the AMERICAN JOURNAL OF INSANITY were presented, and with great regret accepted.

Dr. Hurd was managing editor of the JOURNAL from 1897 to 1904, when at the meeting of the Association in St. Louis he resigned its active direction, consenting, however, to remain in an advisory position—a member of the editorial staff. Our readers will recall the action taken by the Association to show its appre-

ciation of Dr. Hurd's interest in the Association and his active efforts in the editorial conduct of the JOURNAL, an account of which appears in its pages in the number for January, 1906. Dr. Blumer joined the editorial board of the JOURNAL in 1880, when he became a member of the medical staff of the State Hospital at Utica, N. Y., where the JOURNAL was then edited and published.

From the death of Dr. John P. Gray, in 1886, until the JOURNAL became the property of the American Medico-Psychological Association in 1894, he was editor-in-chief.

By direction of the Council the name of Dr. Hurd and of Dr. Blumer will each be carried on the title page of the JOURNAL as editor emeritus, and the present editors hope to frequently benefit by their advice and assistance.

This is the first break in the editorial staff in 21 years. At the meeting of the Association in Baltimore in 1897, Drs. Henry M. Hurd, G. Alder Blumer, Edward N. Brush and J. Montgomery Mosher were appointed by the Council as editors of the JOURNAL; Dr. Charles K. Clarke, of Toronto, Canada, being added to the staff in October, 1904.

The new members of the editorial staff are: Dr. Charles Macfie Campbell, of the Henry Phipps Psychiatric Clinic of The Johns Hopkins Hospital, Baltimore, and Dr. Albert M. Barrett, Director of the Psychiatric Clinic of the University of Michigan at Ann Arbor, Mich.

The managing editor parts with his old associates with many feelings of regret. It has been a pleasure and an inspiration to work with them. The Association, the readers of the JOURNAL, and the medical profession owe them a debt which can never be paid. We welcome the new members of our editorial family and feel confident that they will render efficient aid in maintaining the standard already established by the JOURNAL and in still further elevating that standard.

DEATH OF DR. MACY.—Dr. William Austin Macy, Medical Superintendent of the Kings Park State Hospital, Kings Park, L. I., N. Y., died at the Kings Park State Hospital on May 21 last from cerebral hemorrhage.

An extended notice of Dr. Macy's life and work will appear in the next issue of the JOURNAL.

Book Reviews.

Shell Shock and Its Lessons. By ELLIOT SMITH and T. H. PEAR. Cloth \$1.00. (New York: Longmans, Green & Co., 1917.)

The book was written as a simple non-technical exposition of the ascertained facts of shell shock and seems to fill a definite want. It is divided into chapters describing the nature of shell shock, treatment of the condition, psychological analysis and re-education, general consideration and a final chapter on some lessons of the war especially directed toward increasing the general interest in mental diseases.

Shell shock is essentially an emotional disorder rather than an intellectual or sensory disturbance, and every case must be treated as an individual rather than grouping one case with several others under one name and attempting to treat all in the same fashion.

Shell shock usually begins after a period of intense emotional stimulus which may have existed for days or weeks. Outward signs of the emotions are rare, in many instances all of them are completely suppressed until the final collapse. After a sudden strong stimulus such as a shell bursting near him he falls with or without loss of consciousness. The most obvious phenomena following the onset are undoubtedly the disturbances of sensation and movement. A soldier may be struck deaf, dumb and blind by a bursting shell and these troubles may vanish after a short space of time as suddenly and dramatically as they appeared. Contractures, tremors, stammers, loss of memory, insomnia, dreams, pains, emotional instability, diminution of self-confidence and self-control, attacks of unconsciousness or of changed consciousness, sometimes accompanied by convulsive movements resembling those characteristic of epileptic fits, incapacity to understand any but the simplest matters, obsessive thoughts, usually of the gloomiest and most painful kind, even in some cases hallucinations and incipient delusions may be present in varying degrees.

In treating these cases every effort must be made to gain the patient's confidence and to gain an insight into his mental life and especially into his emotional life. Firmness and isolation, suggestion in its various forms, and hypnosis, while all useful in their proper place, often prove to be of no avail in cases of psychoneurosis. Psychological analysis, not merely the resolution of the patient's mental condition into its essential elements but rather the dissection of the normal as well as the abnormal phenomena into their functional elements is the method of treatment by which the best results are obtained. Unconscious factors of great importance play an influential part in the production of shell shock, as in other mental disorders, and in every case an effort must be made to uncover these submerged streams. The man's mental make-up must be studied and his

dreams, his "slip of the tongue," "slip of the pen," the mislaying of important objects, the forgetting of significant facts, or conversely, the inability to get an apparently unimportant memory out of one's mind must be fully investigated if his condition is to be fully studied and all done for him which can be done.

A neurosis may be regarded as the failure of an act of adaptation. The resultant mental disturbances do not seriously affect the "reason" or the "intellect" as was formerly supposed, but are in character predominantly instinctive and emotional. Therefore, any attempt to restore equilibrium between himself and his social environment must be accompanied by a similar endeavor to bring about his inner harmony, and, in such cases, a certain amount of psychological analysis is indispensable.

The two final chapters are purely a plea for better asylum conditions in England, where all scientific work in the care of mental diseases is subordinated to the housing of the patients. At present in England, as well as in America, the attitude of the general public towards insanity is a mixture of ignorant superstition and exaggerated fear. To counteract this attitude it is necessary that the medical profession as well as the general public be instructed in the nature of mental disorders and that clinics for instruction of students and research laboratories be built in order that even a start may be made to better conditions.

From the above synopsis of the book it is evident that it is a valuable one not only in England, but also in America where conditions are not essentially different and where the attitude of the public towards mental disorders is the same. The war will bring us a number of cases of mental disorders and unless an attempt is made to teach the public that such cases should receive the same care as those suffering from physical disorders, such patients in a short time will be shunted off into some custodial institution and the cause of their disorder forgotten.

The book is well written and can be recommended to the public as well as to the general medical profession.

C. R.

Neurosyphilis Modern Systematic Diagnosis and Treatment Presented in One Hundred and Thirty-Seven Case Histories. By E. E. SOUTHARD, M. D., Sc. D. Bullard, Professor of Neuropathology, Harvard Medical School; Pathologist, Massachusetts Commission on Mental Diseases; Director Psychopathic Department, Boston State Hospital, etc., and H. C. SOLOMON, M. D., Instructor in Neuropathology and in Psychiatry, Harvard Medical School; Special Investigator in Brain Syphilis, Massachusetts Commission on Mental Diseases, etc. With an Introduction by JAMES JACKSON PUTNAM, M. D., Professor Emeritus of Diseases of the Nervous System, Harvard Medical School. (Boston: W. M. Leonard, 1917.)

Drs. Southard and Solomon have produced in this volume a most admirable and valuable work upon a subject, the importance of which is daily being more generally recognized by the profession.

Aside from the work of Nonne there has been no text book available which could with confidence be placed in the hands of the student or the inquiring practitioner.

The one hundred and thirty-seven case histories have been so thoroughly worked up and the essential points of each so clearly pointed out, that they convey to the reader a picture of the disease which, to quote from the introduction by Dr. Putnam, is neither "too diagrammatic" nor "too concise."

The work is divided into seven sections: Section I, Nature and Forms of Syphilis of the Nervous System; Section II, The Systematic Diagnosis of the Forms of Neurosyphilis; Section III, Puzzles and Errors in the Diagnosis of Neurosyphilis (including Non-Syphilitic Cases); Section IV, Neurosyphilis, Medico-Legal and Social; Section V, The Treatment of Neurosyphilis; Section VI, Neurosyphilis and the War; Section VII, Summary and Key.

The authors assume as the result of their studies and work a hopeful attitude as regards neurosyphilis. The prognosis, they say, "is not worse than that of the chronic diseases in general. In fact the prognosis of neurosyphilis *quoad vitam* is either good or dubious, certainly not bad."

Summing up the lessons of the book in a general way they "emphasize again (1) *the unity-in-variety of the phenomena of neurosyphilis*, (2) *the value of a hopeful approach to the therapy of all cases of neurosyphilis, even the parietic form*, and (3) *the value of applying syphilis tests to every case of neurosis or psychosis*."

The treatment chiefly employed by the authors has been what they term the intensive systematic intravenous treatment. This consists of the intravenous injection of salvarsan or of one of its substitutes in doses of about 0.6 gram, repeated twice a week over a period of a number of months. In addition, injections of mercury salicylate averaging 0.065 gram, once a week, are given and potassium iodide by mouth. The important point has been to keep up the treatment for a long time.

The work is a distinct and valuable addition to the literature and one which should be studied by every worker in the fields of neurology or psychiatry.